



PRODUCT OVERVIEW
Forklifts



ELECTRONICS AND LIGHTING MADE FOR MORE SAFETY AND EFFICIENCY



Having a customer focus is not just a catch phrase for us, it's a philosophy that we continue to put into practice each and every day – as our extensive product portfolio and comprehensive services demonstrate.

Do you require products that are precisely tailored to your requirements? Not a problem for us. We develop and construct customised lighting solutions specifically for the requirements of forklifts and reach trucks. We are a leader in the field of LED technology, offering the right LED product for any application. A wide range of electric and electronic products complete our product offering.

We deliver products that increase occupational safety and effectiveness. Taken from experience – and put into practice.

Are you already familiar with our 50 LED Spot module?

The 50 LED Spot module increases occupational safety and helps to reduce accidents. Other vehicles or pedestrians are visually warned by means of a light spot on the ground. Thanks to its compact dimensions, the 50 LED module is particularly well-suited when little space is available for installation.

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50 LED Spot module video:
Watch our product and application
video on YouTube.





GENIUS CAB CONCEPT SUCCESS BUILT ON COOPERATION

The CAB Concept Cluster is a collaboration between well-known and established OEM suppliers, as well as renowned scientists in the field. The focus of this was the development of an innovative concept cab under the working title of 'Genius Cab', which was presented for the first time in 2016 at the bauma trade fair in Munich.

The aim is to provide OEMs of forklifts and industrial lift trucks with a better understanding of the great potential of efficient system integration. The Genius CAB comprises innovative

components from all cooperation partners, who wish to set benchmarks on the international markets when it comes to safety, operability, driver comfort, maintenance, and design.

As the lighting and electronics expert, Hella contributes the LED work lights, the signature light, the interior lighting, the radio remote control to unlock the door, the accelerator pedal, and the rain/light sensor.

Find out more at www.cabconceptcluster.com

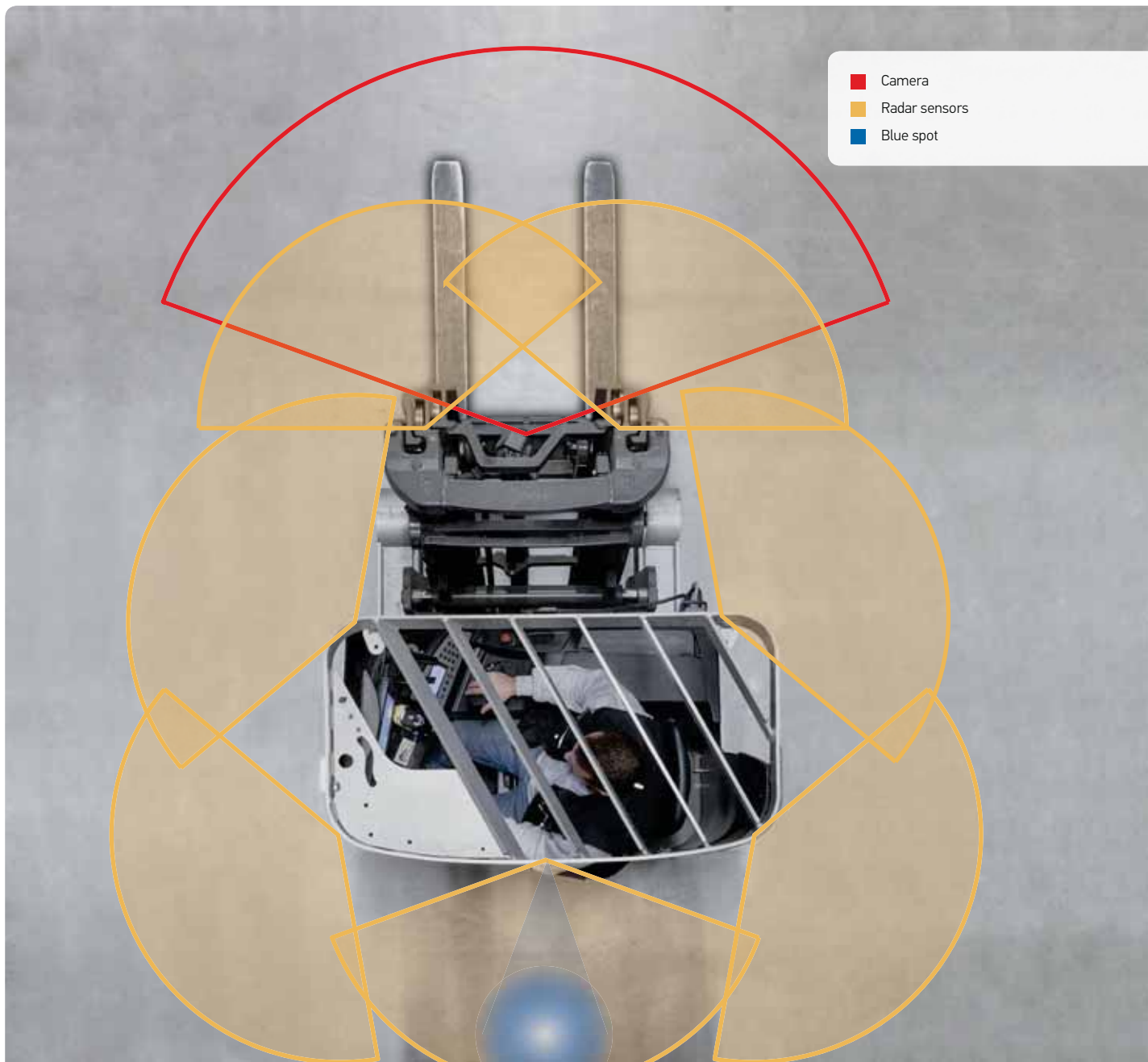


INNOVATIVE SAFETY ARCHITECTURE WITH ELECTRONIC AND LIGHT COMPONENTS

As part of the CAB Concept Cluster, ideas were also developed for the innovative and efficient design of environmental recognition for forklifts. For example, radar and camera systems or optical light components – such as the 50 LED Spot module already available – can be connected to a central domain controller.

Reliable safety architecture can be created through the fusion of these various sensor technologies.

More and more driverless transport systems are being used in the manufacturing industry. All integral logistics processes relating to the transport of packaged goods are essentially automatable.



HELLA IS QUALITY – YOU CAN COUNT ON THAT

HELLA has set itself the ambitious standard of guaranteeing consistently high product quality in every respect

This is achieved by defining quality criteria and checking every detail using carefully-selected methods throughout the entire manufacturing process. Production quality is ensured by parallel quality monitoring and testing.

Quality products from HELLA are subject to different test procedures in accordance with HELLA standard 67101. These test procedures are conducted by the HELLA test laboratory in Lippstadt, Germany.

First-class quality by conviction

HELLA provides a long-term guarantee that its products work perfectly and is committed to achieving customer satisfaction in the spare parts, accessories and light sources areas.

As the long-established company from Lippstadt is a partner to the automotive industry, HELLA products are manufactured precisely according to the specified tolerances in each case.

This, combined with the use of sophisticated test procedures during product development, means that you can depend on HELLA products in any situation.



You will find further information on the HELLA quality criteria at: www.hella.com/quality

Before HELLA products are brought onto the market, they undergo rigorous testing:

Heat, moisture and cold test



Freezing conditions down to -40°C and at full power up to $+100^{\circ}\text{C}$, also rapid temperature fluctuations, condensation and decondensation tests at air humidities up to max. 95%.

⊕ HELLA LED products withstand rapid temperature fluctuations and changes in air humidity.

Environmental conditions such as rain, splash water, hose water and spray are simulated in splash water booths.

⊕ HELLA LED products are splash-proof.

Splash water test



High-pressure cleaner test



Simulation of cleaning in a car wash with extremely high water pressure of up to 120 bar and water temperatures up to +85°C.

⊕ HELLA LED products can be cleaned using a high-pressure cleaner without a problem.

During this test, our products are exposed to powerful vibrations and impacts.

⊕ HELLA LED products offer guaranteed high resistance to vibrations.

Vibration test



Dust test



Intensive tests guarantee dust tightness, even with the tiniest of dust particles.

⊕ HELLA LED products are exceptionally tight to protect sensitive components from dust.

Underwater pressure testing at depths of up to 6 m guarantees the leak tightness of our products.

⊕ HELLA LED products are leak tight.

Immersion and pressure tightness test



DID YOU KNOW?

- The heat and cold tests last up to 48 hours.
- The leak tightness of products is tested by carrying out intermittent and splash water tests at pressures up to 5 bar, and a spray water test at a pressure of up to 10 bar.
- During the vibration test, all products are tested for up to 24 hours when in operation.
- An overpressure test up to 1.6 bar is performed in an immersion tank.

THERMAL MANAGEMENT

The service life of a LED heavily depends on its temperature and the applied current. If the LEDs overheat (usually because the input currents are too high), their service life will be drastically reduced. Effective thermal management is therefore extremely important.

HELLA uses state-of-the-art simulation programs to precisely calculate the heat flow. The task of the developer is to protect the LED from overheating and to ensure heat is removed reliably and efficiently.

Why use thermal management?

- The basis for effective uniform lighting
- Keeps the LEDs within the optimum temperature range
- Increases the service life of the product
- Reduces the risk of failure

Most important components

- Cooling fins incorporated into headlamp casing
- High-quality LEDs (automotive standard)
- Thermosensors for temperature monitoring
- Heat-dissipating substances (film, paste, ...)

⊖ INSUFFICIENT THERMAL MANAGEMENT

The heat on the PCB is not being sufficiently dissipated by the heat sink, i.e. there is a risk of the LEDs overheating. If they are damaged they could cause a failure.

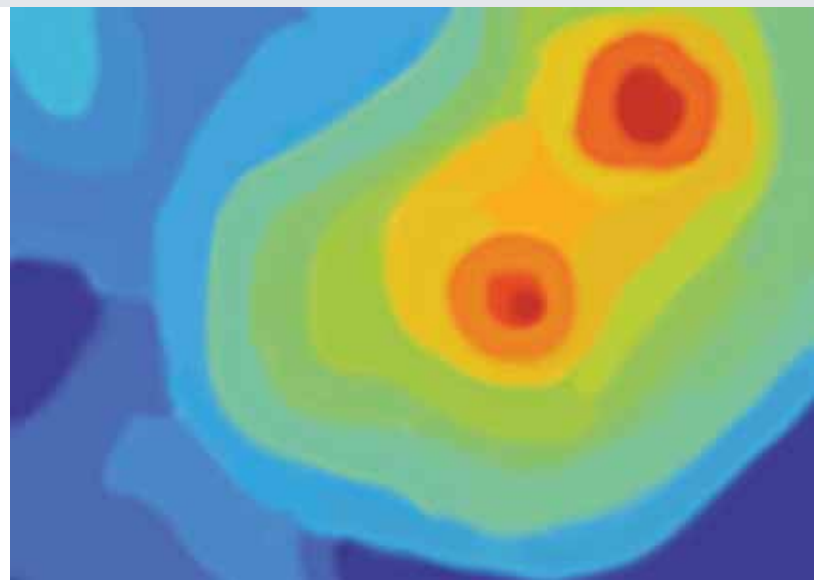
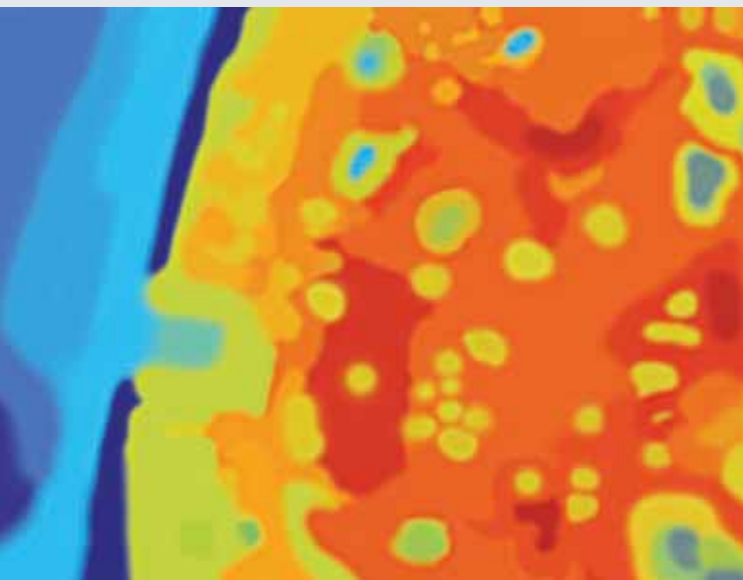
⊖ Disadvantages:

- Low light output
- Accelerated wear
- Reduced service life
- Overheating = downtimes and repair time

Hot spots cause the components to expand at different rates which normally leads to failure.

⊖ Disadvantages:

- Mechanical stress on the circuit board
- The adhesive bond on components breaks
- Breaks in soldering points
- Cracks in the circuit board
- Result: Short circuit



Thermosensors for greater safety

HELLA LED products are equipped with thermal management which, assisted by temperature sensors, can actively intervene in the system. These sensors monitor the temperature of the LED and respond immediately. If the system identifies excessively high temperatures, it automatically reduces the input current. During this process, the light output of the headlight is dimmed until the temperature of the LEDs is once again within the optimum range. The LEDs are therefore always operated under perfect conditions. This is the only way to achieve a service life of up to 60,000 hours.

LEDS

Many LED products are impressive due to their powerful light outputs. Many manufacturers also push LEDs to their limits and also far beyond in order to maximise the light outputs. If the operating temperature of LEDs is too high, this has a direct effect on the service life and luminous efficiency of the product. The full potential of the LEDs can then only be exploited if the heat generated is deflected outwards to prevent the LEDs from overheating.

If you want to get the best out of LED technology, thermal management is essential!

⊕ EXAMPLE OF OPTIMUM THERMAL MANAGEMENT BY HELLA USING A BEACON

The thermal imaging camera clearly shows how HELLA thermal management works:

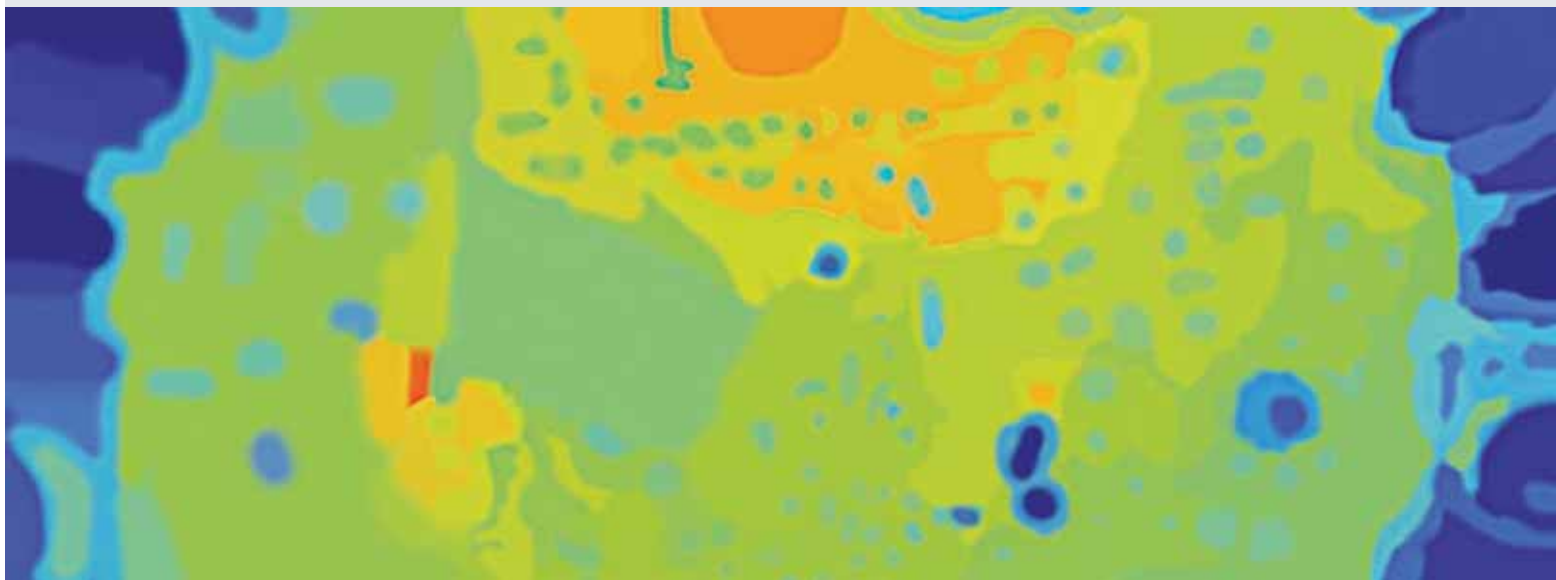
The high temperatures of the LEDs are distributed uniformly across a large surface area which then transfers this heat to the surroundings.

The heat dissipation, and therefore the thermal conductivity of the housing in headlamps, for example, can be improved by using cooling fins.

HELLA selects heat-conductive materials and arranges components to ensure effective heat flow. Thermal management dissipates heat from the LED. This is why we can guarantee a long service life for our products!

⊕ Advantages:

- Effective heat flow
- Optimum temperature distribution
- Long service life
- Reliability





2 x halogen work lights (H3)

HALOGEN LIGHTING

Forklift with halogen lighting

The vehicle is fitted with two halogen work lights (H3). The halogen work lights (H3) are characterised by homogenous illumination. However, if you compare the two pictures, you can clearly see the difference between halogen and LED work lights – the light colour.

Halogen bulbs tend to generate less bright light with an obvious yellow cast. With a halogen light, it is quite difficult to detect the cut-off line due to the colour temperature (2,500° Kelvin). The energy consumption of a halogen work light is around 55 watts. This is 18 watts with a comparable LED work light.



2 x LED work light, Power Beam 1000

LED LIGHTING

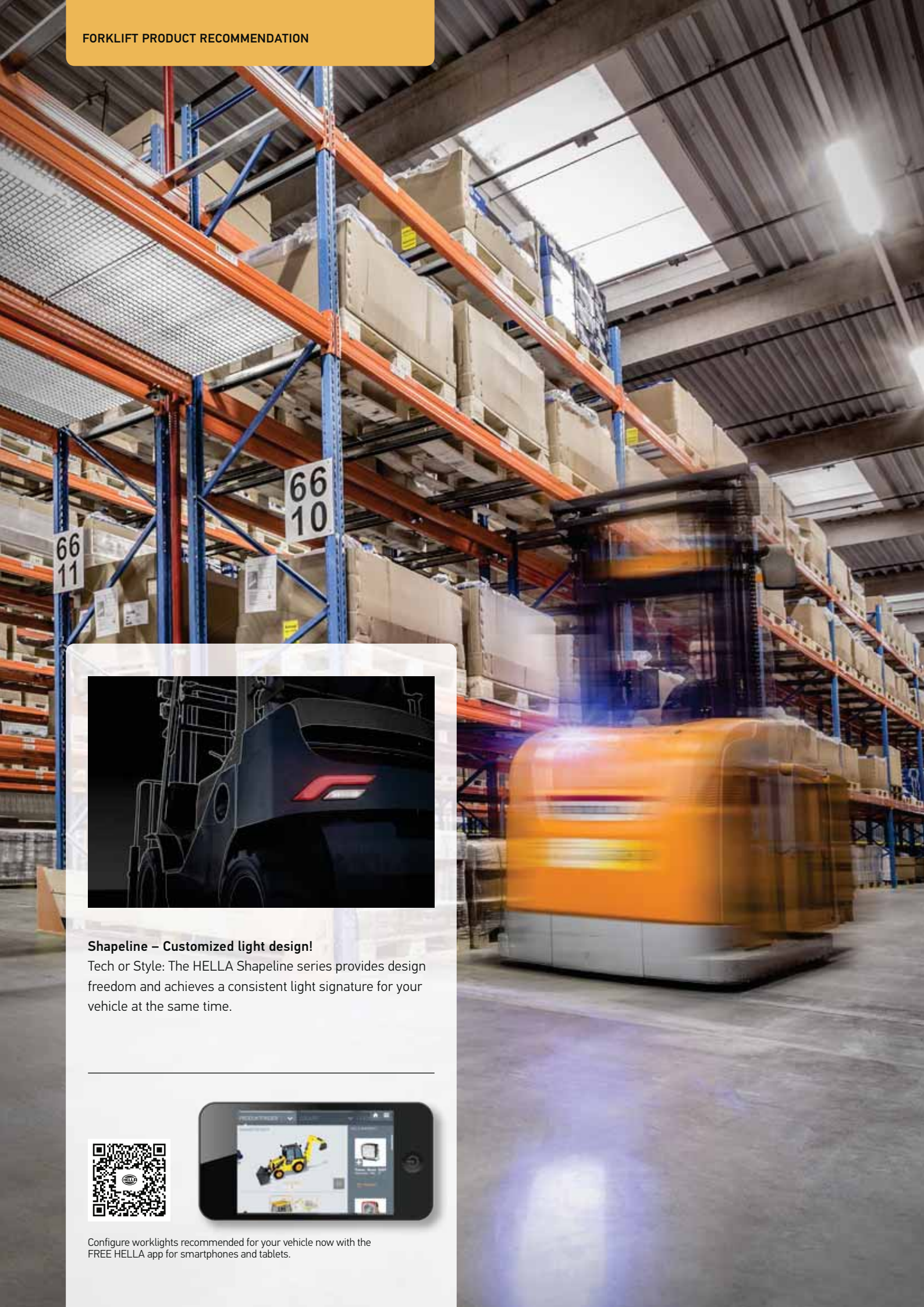
This is a forklift fitted with HELLA LED work lights

Two LED work lights were installed for the conversion. The Power Beam 1000 is an LED work light that is setting new standards with its powerful light output.

The integrated electronics protect the device in the event of polarity inversion and guarantee constant brightness, even when the operating voltage fluctuates between 9 and 33 volts. The light from the 6 high-power LEDs is distributed to the surrounding work area by a specially developed multifaceted reflector.

The Power Beam 1000 can be mounted either upright (0°) or in a pendant position (180°). At 6,500° Kelvin, the light of the LED work light is very similar to daylight. It has a low power consumption of just 18 watts.

Furthermore, the image demonstrates the greatly optimised illumination of the work area thanks to HELLA LED work lights.



Shapeline – Customized light design!

Tech or Style: The HELLA Shapeline series provides design freedom and achieves a consistent light signature for your vehicle at the same time.



Configure worklights recommended for your vehicle now with the FREE HELLA app for smartphones and tablets.

HELLA product recommendation work lights

HELLA worklights are extremely energy efficient. A clear advantage when used on electric forklifts. After all, efficient worklights mean less charging and minimised downtime for the vehicle.



Forklift: Body front/rear



Q90 compact LED
1GA 996 284-002

- Depending on alignment, either the forklift arm or the rack can be illuminated.
- A combination of two work lights is recommended.

Close-range illumination
Page 19



Modul 70 LED Gen. III
1G0 996 276-481

- Compact dimensions, low weight and homogenous light distribution.
- Low energy consumption (13 W).

Close-range illumination
Page 16



**Modul 50 LED -
Color Spot**
1G0 996 050-061

- Blue warning sign in front of vehicle for greater safety.

Close-range illumination
Page 17



Forklift: Forklift cab, front



Mega Beam LED Gen. III
1GM 996 136-311

- Excellent light distribution in the close range.
- Stylish, modern design.

Close-range illumination
Page 19



Q90 compact LED
1GA 996 284-002

- Depending on alignment, either the forklift arm or the rack can be illuminated.
- A combination of two work lights is recommended.

Close-range illumination
Page 19



Ultra Beam LED Gen. I
1GA 995 506-001

- With 2,200 lumen output, the Ultra Beam LED offers sufficient rear light and enables precise working

Close-range illumination
Page 18

Working at night or in the early morning in the dark is no problem – providing you have the right light to work with!

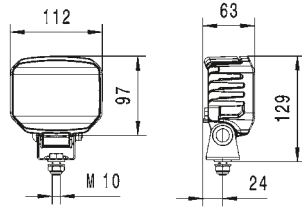
HELLA work lights generate the right illumination of the working area for every application. They are specifically designed and developed to illuminate the largest possible area with a soft transition to the edge areas.

Worklights can be installed in many different areas and environments, whether it be agriculture, construction vehicles, forestry management or when working with forklift trucks.

So that every move counts, even in the dark: see more, work more precisely and safely – HELLA Worklights.



This LED product has the following features:



Power Beam 1500

Light output (measured): 1,300 lumens, power requirement: 22 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof/ submersible), ECE-R10 approved, high-quality aluminium housing, ADR/ GGVS tested.

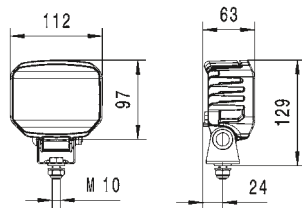
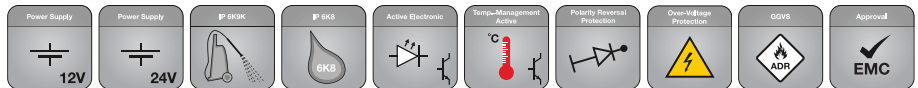
Close-range illumination

DT connector	1GA 996 288-011
DT connector, heavy-duty surrounding bracket	1GA 996 288-031

Long-range illumination

DT connector	1GA 996 288-001
DT connector, heavy-duty surrounding bracket	1GA 996 288-021
DT connector, orange lens	1GA 996 288-041

This LED product has the following features:



Power Beam 1800

Light output (measured): 1,850 lumens, power requirement: 36 watts, colour temperature: 6,500° Kelvin, single voltage (12 or 24 volts), polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof/ submersible), ECE-R10-approved, high-quality aluminium housing.

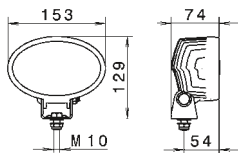
Close-range illumination

12 V, DT connector, dimmer function	1GA 996 388-001
24 V, DT connector, dimmer function	1GA 996 388-011

Long-range illumination

12 V, DT connector, dimmer function	1GA 996 388-021
24 V, DT connector, dimmer function	1GA 996 388-031

This LED product has the following features:



Oval 100 LED/Oval 100 LED Thermo Pro

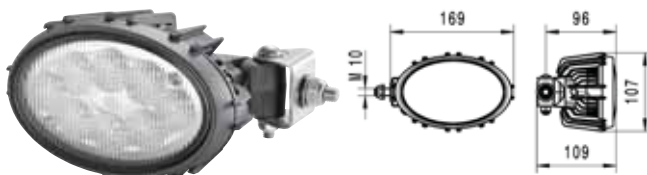
Light output (measured): 1,700 lumens, power requirement: 25 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof/ submersible), ECE-R10-approved, ADR/ GGVS-tested, DT connector.

Close-range illumination	1GA 996 661-001
Long-range illumination	1GA 996 661-011

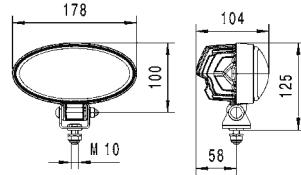
Thermo Pro plastic housing

Lateral mounting, hinge	1GA 996 661-031
Upright or pendant surface mounting	1GA 996 661-041
Upright/pendant mounting, hinge	1GA 996 661-501

Thermo Pro



This LED product has the following features:

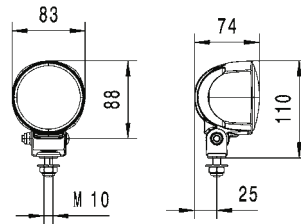
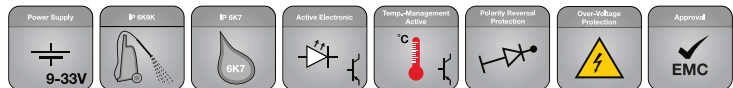


Oval 90 LED

Light output (measured): 2,000 lumens, power requirement: 28 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10 approved, high-quality aluminium housing, ADR/ GGSV-tested, DT connector.

Close-range illumination	1GB 996 386-001
Long-range illumination	1GB 996 386-021

This LED product has the following features:

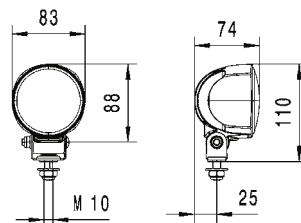
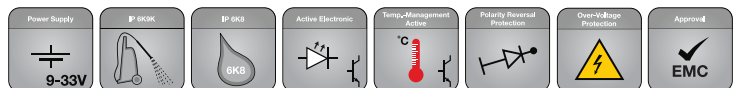


Modul 70 LED Gen. III

Light output (measured): 800 lumens, power requirement: 13 watts, colour temperature: 6,500° kelvins, multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 6K7 (pressure cleaner-proof / immersible), ECE-R10 approved, high grade aluminium housing.

Close-range illumination	
2,000 mm cable, 600 lm, 13 W, 10 – 100 V	1G0 996 276-077
2,000 mm cable	1G0 996 276-451
2,000 mm cable, 12 V, plastic housing	1G0 996 376-501
Long-range illumination	
2,000 mm cable, spot illumination, blue lens	1G0 996 276-701
2,000 mm cable, spot illumination	1G0 996 376-001

This LED product has the following features:

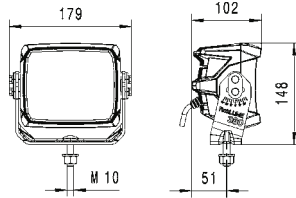


Modul 70 LED Gen. IV

Light output (measured): 2,500 lumens, power requirement: 30 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10-approved, high-quality aluminium housing.

Close-range illumination	
2,000 mm cable	1G0 996 476-001
2,000 mm cable, extra-wide illumination	1G0 996 476-031
Long-range illumination	
2,000 mm cable	1G0 996 476-011

This LED product has the following features:

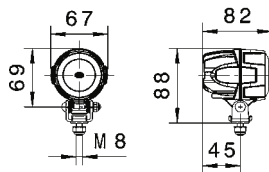


RokLUME 380 N

Light output (measured): 7,800 lumens, power requirement: 84 watts, colour temperature: 5,000° Kelvin, 22 – 32 V, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10-approved, aluminum die-cast housing "NanoSafe non-stick easy to clean" – surface coating, DT connector.

ZEROGLARE	1GA 996 197-001
Long-range illumination	1GA 996 197-021
Close-range illumination	1GA 996 197-031
Spot illumination	1GA 996 197-041

This LED product has the following features:



Modul 50 LED/Modul 50 LED Spot

Light output (measured): 800 lumens, power requirement: 15 watts, colour temperature: 6,500° Kelvin, multivolt 9 – 52 V, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10 approved, high-quality aluminium housing, ADR/ GGVS-tested, DT connector.

Close-range illumination	1G0 995 050-001
Long-range illumination	1G0 995 050-021

Spot illumination

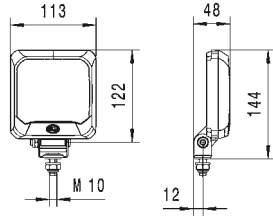
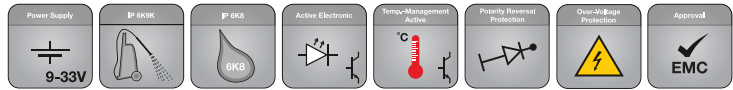
white	1G0 995 050-051
Blue	1G0 995 050-061
green	1G0 995 050-071
Red	1G0 995 050-081



Modul 50 LED Spot

- Special use as a warning light
- Punctiform illumination on the ground
- Increases working safety
- Available in various colours

This LED product has the following features:



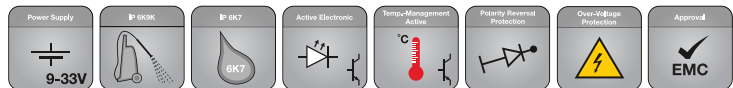
Flat Beam 500

Light output (measured): 550 lumens, power requirement: 7 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10-approved, impact-resistant plastic housing, downward 45° illumination as standard, 2,000 mm cable.

Close-range illumination

Standard holder	1GA 995 193-001
Wall-mounted	1GA 995 193-021
Lug mounting	1GA 995 193-031
Surrounding bracket	1GA 995 193-041

This LED product has the following features:

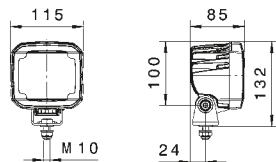


LED Light Bar 350

Light output (measured): 2,200 lumens, power requirement: 25 watts, colour temperature: 5,000° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K7 (pressure cleaner-proof / submersible), ECE-R10-approved, Thermo Pro plastic housing, 2,500 mm cable.

Close-range illumination	1GJ 958 040-501
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This LED product has the following features:

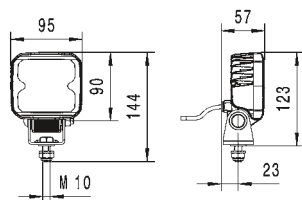
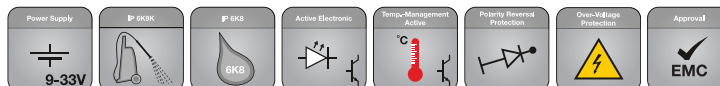


Ultra Beam LED Gen. I

Light output (measured): 2,200 lumens, power requirement: 30 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10-approved, high-quality aluminum housing, ADR/ GGVSEB-tested.

Close-range illumination	1GA 995 506-001
Long-range illumination	1GA 995 506-031

This LED product has the following features:



Q90 compact LED

Light output (measured): 1,200 lumens, power requirement: 15 watts, colour temperature: 6,500°Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10-approved, Thermo Pro plastic housing.

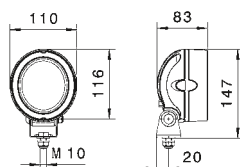
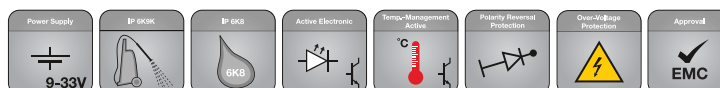
Close-range illumination

500 mm cable	1GA 996 284-001
150 mm cable and DT connector, ADR / GGVSEB-tested	1GA 996 284-081

Long-range illumination

500 mm cable	1GA 996 284-011
150 mm cable and DT connector, ADR / GGVSEB-tested	1GA 996 284-091

This LED product has the following features:

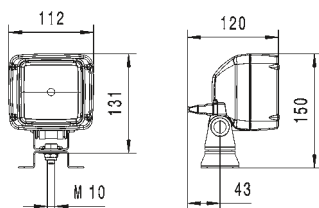


Mega Beam LED Gen. III

Light output (measured): 800 lumens, power requirement: 13 watts, colour temperature: 6,500° Kelvin, multivolt, polarity reversal protection, overvoltage protection, thermal management, IP 6K9K / IP 6K8 (pressure cleaner-proof / submersible), ECE-R10-approved, high-quality aluminium housing, 2,000 mm cable.

Close-range illumination

Mounting, upright	1GM 996 136-311
Mounting, pendant	1GM 996 136-361
Mounting, upright, 36–80 V	1GM 996 136-131



Ultra Beam

Light output: 1,150 / 1,400 lumens (H3) or 1,700 lumen (H9), colour temperature: 2,500° Kelvin (H3) / 3,200° Kelvin (H9), impact-resistant glass-fibre reinforced plastic housing, window pane, IP 5K9K (pressure cleaner-proof), GGVSEB / ADR-tested. 12 / 24 V, 55 / 70 W.

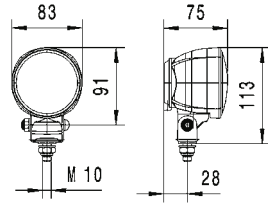
Close-range illumination

Upright surface mounting, AMP connector, H3	1GA 007 506-011*
Upright/pendant mounting, DT connector, H3	1GA 007 506-391*

Long-range illumination

Upright or pendant surface mounting, 12 V, 65 W, 1,700 lm, AMP connector, 4-point attachment, incl. H9 bulb	1GA 996 150-081
Upright surface mounting, AMP connector, H3	1GA 997 506-021*

* Without bulb.



Modul 70

Light output: 1,150/1,400 lumens or 1,700 lumen, colour temperature: 2,500°Kelvin (H3) / 3,200° Kelvin (H9), impact-resistant glass-fibre-reinforced plastic housing, IP 5K9K (pressure cleaner-proof).

Close-range illumination

Upright surface mounting, cable inlet with grommet, H3	1G0 996 176-001*
12 V, 65 W, upright surface mounting, H9 plug-in connection, incl. H9 bulb	1G0 996 176-041
12 / 24 V, 55 / 70 W, upright surface mounting, cable inlet with grommet	1G0 996 176-111*
12 V, 65 W, upright surface mounting, 2,000 mm cable, incl. H9 bulb	1G0 996 176-171
12 V, 65 W, pendant surface mounting, 2,000 mm cable, incl. H9 bulb	1G0 996 176-181

Long-range illumination

Upright surface mounting, cable inlet with grommet, H3	1G0 996 176-011*
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* Without bulb.

ACCESSORIES



Connector

The comprehensive product range of HELLA accessories for plug connections offers solutions for virtually every application area. Unwanted failures are frequently caused by faulty wiring, not the products themselves. The HELLA SUPERSEAL product range enables a waterproof and dustproof connection of the cable ends, therefore offering optimal working conditions in all kinds of weather.

GERMAN plug set, 2-pin	8JA 201 022-801
GERMAN plug set, 6-pin	8JA 201 022-831
AMP connector set (consisting of AMP connector and installation sleeve)	8JD 990 295-037
HB3 connector (10x)	8JA 990 295-217
H9 connector (x20)	8JD 158 175-807
SUPERSEAL, assortment case comprising various SUPERSEAL plug housings, pin/socket contacts, individual conductor seals and blind plugs (780 parts)	8JA 009 256-801



Cables

HELLA offers numerous adapter cables for simple setup of the headlamps as an accessory.

2,000 mm cable with AMP connector and bare cable heads	8KB 990 299-001
2,000 mm cable with DEUTSCH connector and bare cable heads	8KB 990 299-011
2,000 mm cable with H9 connector and open cable ends and rubber cap	8KB 990 299-311
2,000 mm cable with HB3 connector and bare cable heads	8KB 990 299-331
200 mm adapter cable from DEUTSCH to AMP connector	8KB 990 299-361
230-volt power supply (suitable for headlamps up to max. 45 W)	8EN 332 584-001



Bulbs

The HELLA range of bulbs offers light variants specially developed for the various application purposes, such as Light Power with particularly high light output or Lifetime with a very long service life. There are many more to choose from at www.hella.com/bulbs

H3 12 V / 55 W	8GH 002 090-133
H3 24 V / 70 W	8GH 002 090-251
HB3 LL 12 V / 60 W	8GH 005 635-181
H9 12 V / 65 W	8GH 008 357-001
D1S xenon bulb	8GS 009 028-001

ACCESSORIES

Product photo	Description	Part number
Brackets		
	<p>Pipe socket fixing bracket For combination with socket tubes 8HG 002 365-001. Suitable for mounting with 42 mm bracket width. Electrical contacting within the pipe socket via socket according to DIN 7 2 591.</p> <p>With AMP connector or grommet Model series: Halogen: Ultra Beam, Mega Beam and Oval 100</p>	8HG 990 320-001
	<p>With DEUTSCH or grommet connector Model series: LED: Ultra Beam, Oval 100, Power Beam, and Module 90 Halogen: Ultra Beam</p>	8HG 990 320-011
	<p>Mirror bracket attachment Rotatable universal holder for mounting on tubes/pipes (diameter: 15-25 mm). For replacement on worklights with 36 mm or 42 mm bracket width.</p> <p>36 mm bracket width Model series: Oval 90, Module 70 and Flat Beam 500</p>	8HG 990 263-111
	<p>42 mm bracket width Model series: Ultra Beam, Mega Beam, Oval 100, Power Beam, Modul 90, Q90 LED and AP 1200 LED</p>	8HG 990 263-131
	<p>Magnetic mounting bracket For worklights with U-bracket. Contains 2 magnets and fastening materials.</p> <p>Model series: All work lights with standard bracket</p>	8HG 004 806-001
	<p>Four-point mounting Made from yellow chrome-plated steel</p> <p>Model series: All work lights with standard bracket</p>	9XD 990 298-001
	<p>Four-point mounting Made of stainless steel with oblong holes</p> <p>Model series: All work lights with standard bracket</p>	9XS 130 261-001
	<p>Angle bracket Angle attachment for worklights with 42 mm bracket width.</p> <p>Model series: Ultra Beam, Mega Beam, Oval 100, Power Beam, Modul 90, Q90 LED and AP 1200 LED</p>	9XD 990 298-031
	<p>Plastic bracket Glass-fibre reinforced standard bracket for work lights.</p> <p>Model series: Ultra Beam, Mega Beam, Oval 100, Power Beam, Modul 90, Q90 LED and AP 1200 LED</p> <p>42 mm bracket width</p>	8HG 332 912-002
	<p>Standard bracket With extra space to the rear.</p> <p>Model series: Ultra Beam, Mega Beam, Oval 100, Power Beam, Modul 90, Q90 LED and AP 1200 LED</p> <p>42 mm bracket width</p>	8HG 992 377-042
	<p>Oblong hole bracket Special bracket with oblong hole for mounting.</p> <p>Model series: Oval 90, Module 70 and Flat Beam 500</p> <p>36 mm bracket width</p>	8HG 331 414-372
	<p>Forked bracket Special bracket for flush assembly.</p> <p>Model series: Oval 90, Module 70 and Flat Beam 500</p> <p>36 mm bracket width</p>	8HG 994 412-372
	<p>Standard bracket with eye Standard bracket for extensions with restricted space to the rear.</p> <p>Model series: Ultra Beam, Mega Beam, Oval 100, Double Beam, AS 200, Power Beam, Module 90, Q90 LED and AP 1200 LED</p> <p>42 mm bracket width</p>	8HG 994 974-002

The complete range of HELLA accessories can be found in the brochure "Electrical vehicle installations".

No light, no vision

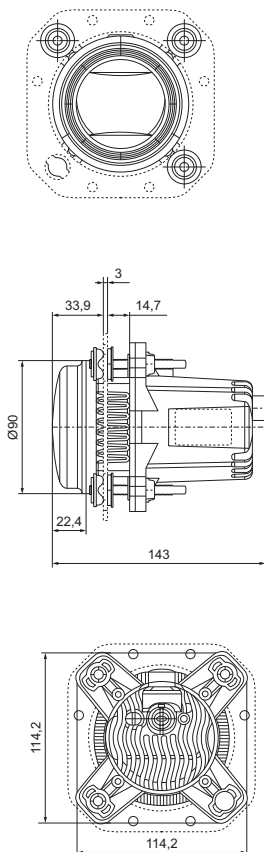
This applies not just to "seeing" but also "being seen". Due to the fact that the vehicle lighting plays an important role in the safety of all those on the road, HELLA develops innovative lighting systems that offer a high level of driving comfort and also provide optimum illumination of the road ahead.

Also, the issue of "styling" is growing in importance. This is where the LEDs come into their own, as they allow new paths to be taken when designing the vehicle, and also mean that brand-specific appearances can be created.

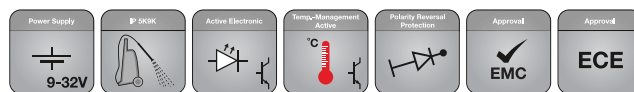
90 MM: L 4060 LED LOW BEAM

Uniform illumination similar to daylight. Low beam, daytime running light and position light in one module or as a separate low beam. 40 x 60 mm polycarbonate lens for a new design. Mounting points as for Performance module for 1:1 exchange. FEP or DEUTSCH connection. Hardened plastic cover lens. Integrated electronics, robust die-cast aluminium housing, multi-volt 9 - 32 V. Perfectly fitting adjustment screws for Premium and Performance attachment included in the scope of supply.

**Performance module mount
for 1:1 conversion of existing
halogen versions**



These LED products have the following features:



L 4060 LED low-beam headlamp*

Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9-32 V.

Right-hand traffic/USA version, FEP connector	1BL 012 488-001
Left-hand traffic, FEP connector	1ML 012 488-011
Right-hand traffic/USA version, DEUTSCH connector	1BL 012 488-101
Left-hand traffic, DEUTSCH connector	1ML 012 488-111

Type approval: 1BL 012 488-001: (E) 3831, 1ML 012 488-011: (E) 4090,
1BL 012 488-101: (E) 3881, 1ML 012 488-111: (E) 4090



L 4060 LED low-beam headlamp with daytime running/position light*

Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9-32 V.

Right-hand traffic/USA version, FEP connector	1BL 012 488-021
Left-hand traffic, FEP connector	1ML 012 488-031
Right-hand traffic/USA version, DEUTSCH connector	1BL 012 488-121
Left-hand traffic, DEUTSCH connector	1ML 012 488-131

Type approval: 1BL 012 488-021: (E) 3831, 1ML 012 488-031: (E) 4090,
1BL 012 488-121: (E) 3881, 1ML 012 488-131: (E) 4090

*In areas where the ECE-R48 regulation applies, vehicles registered in accordance with ECE-R48, series 05 must incorporate suitable measures to safeguard active failure monitoring of an LED headlamp in the vehicle electrical system. For vehicles that are registered in accordance with ECE-R48, series 06, the failure monitor is no longer mandatory.

A 3A fuse from HELLA must be used for all LED headlamps. A fuse of >3A is not sufficient to safely interrupt the power supply in the event of a fault. If the degree of protection is unknown, an external safety switch (e.g. 8JD 743 557-021) must also always be used. If water gets in, incorrect protection can lead to damage ranging from melting to burning of the product.

90 MM: L 4060 LED HIGH BEAM

High-end illumination. High beam, daytime running and position lights in one module, one high-beam/direction indicator combination or high beam as a separate module. 40 x 60 mm polycarbonate lens for a new design. Pattern-free and hardened plastic cover lens. High-beam headlamp with either pre-mounted carrier frame or as a 90 mm Performance module mount for 1:1 conversion. Integrated FEP plug and control electronics. Sturdy die-cast aluminium housing, multi-volt 9 - 32 V.

These LED products have the following features:



L 4060 LED high-beam headlamp

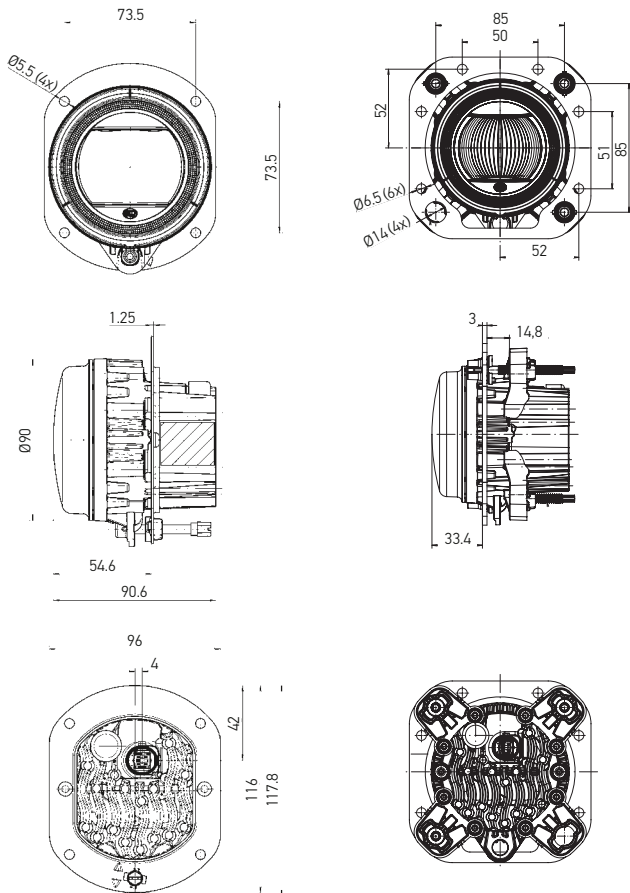
Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9- 32 V.

Preassembled carrier frame	1F0 011 988-021
Performance mount	1F0 011 988-121

Type approval: E 3831

With preassembled carrier frame

Performance module mount for 1:1 conversion of existing halogen versions



L 4060 LED high-beam headlamp, with daytime running light/position light

Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9- 32 V.

Preassembled carrier frame	1F0 011 988-031
Performance mount	1F0 011 988-131

Type approval: E 3831



L 4060 LED high-beam headlamp, with direction indicator

Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9- 32 V.

Preassembled carrier frame, with pulse generator	1F0 011 988-081
Preassembled carrier frame, without pulse generator	1F0 011 988-071
Performance attachment, with pulse generator	1F0 011 988-181
Performance attachment, without pulse generator	1F0 011 988-171

Type approval: E 3831

Please see the note on page 92 regarding LED direction indicators and LED light failure monitor.

A 3A fuse from HELLA must be used for all LED headlamps. A fuse of >3A is not sufficient to safely interrupt the power supply in the event of a fault. If the degree of protection is unknown, an external safety switch (e.g. 8JD 743 557-021) must also always be used. If water gets in, incorrect protection can lead to damage ranging from melting to burning of the product.

Pulse generator: Malfunctions of the high beam with direction indicator module can usually be detected with the vehicle control unit. The detection stages are as follows:
 DI: < 400 mA; HB: < 800 mA. If your control unit cannot detect stage < 400 mA for DI, the pulse generator will increase the amperage in an interval of 100 to 120 ms to simulate the level consistent with a standard 12 V (21 W) bulb.

90 MM: L 4060 FOG LIGHT

Uniform illumination similar to daylight. Fog light in various combinations or as a separate module, with daytime running light, position light and cornering light. 40 x 60 mm polycarbonate lens, pattern-free hardened cover lens made of plastic, integrated FEP connector and driver electronics. Sturdy die-cast aluminium housing, multi-volt 9 - 32 V.

These LED products have the following features:



L 4060 LED front fog lamp

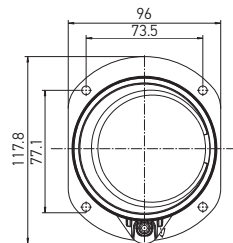
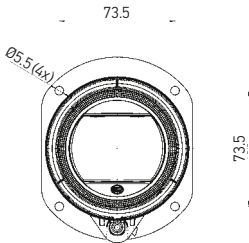
Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9- 32 V.

Preassembled carrier frame 1N0 011 988-001

Type test: © 3831

With preassembled carrier frame
1N0 011 988-001
1N0 011 988-011

With preassembled carrier frame
1N0 011 988-051
1N0 011 988-061

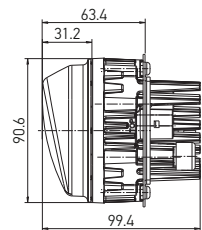
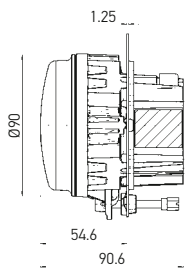


L 4060 LED front fog lamp, with daytime running light and position light

Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9- 32 V.

Preassembled carrier frame 1N0 011 988-011

Type approval: © 3831



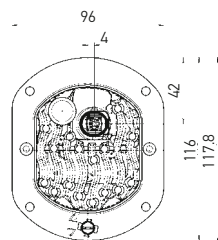
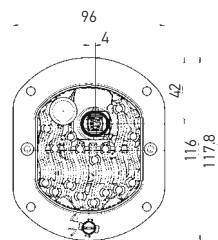
L 4060 LED front fog lamp, with cornering light

Module headlamp with 40 x 60 mm polycarbonate lens, robust aluminium die-cast housing, silver design cover, (black design cover available upon request). Multi-voltage 9- 32 V.

Preassembled carrier frame, right 1N0 011 988-061

Preassembled carrier frame, left 1N0 011 988-051

Type approval: © 3832

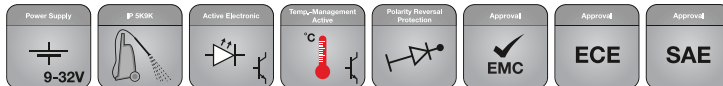


A 3A fuse from HELLA must be used for all LED headlamps. A fuse of >3A is not sufficient to safely interrupt the power supply in the event of a fault. If the degree of protection is unknown, an external safety switch (e.g. 8JD 743 557-021) must also always be used. If water gets in, incorrect protection can lead to damage ranging from melting to burning of the product.

90 MM: L 5570 BI-LED MODULE, LOW AND HIGH BEAM

2nd generation Bi-LED module with enhanced lighting/electronics. 55 x 70 mm polycarbonate lens, pattern-free hardened plastic cover lens, no moving parts, passive cooling. FEP and DEUTSCH connector, USA version available. Integrated function output for failure monitor. Multi-voltage 9 - 32 V.

These LED products have the following features:



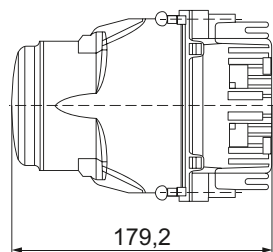
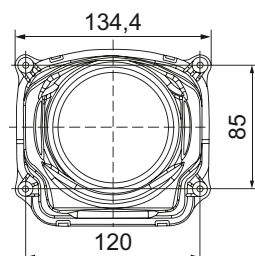
2nd generation L 5570 bi-LED low-beam and high-beam headlamp

Module headlamp with 55 x 70 mm polycarbonate lens, robust aluminium die-cast housing, hardened plastic cover lens, no moving parts, multivolt 9 – 32 V.

Right-hand traffic, FEP connector	1AL 012 758-001
Left-hand traffic, FEP connector	1LL 012 758-011
USA version, FEP connector	1AL 012 758-021
Right-hand traffic, DEUTSCH connector	1AL 012 758-101
Left-hand traffic, DEUTSCH connector	1LL 012 758-111
USA version, DEUTSCH connector	1AL 012 758-121

Type approval: right-hand traffic: © 4208, left-hand traffic: © 4209,
USA versions: SAE

2nd generation



*In areas where the ECE-R48 regulation applies, vehicles registered in accordance with ECE-R48, series 05 must incorporate suitable measures to safeguard active failure monitoring of an LED headlamp in the vehicle electrical system. For vehicles that are registered in accordance with ECE-R48, series 06, the failure monitor is no longer mandatory.

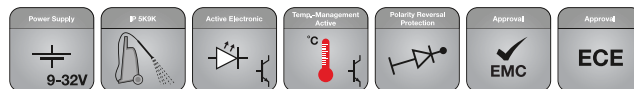
A 3A fuse from HELLA must be used for all LED headlamps. A fuse of >3A is not sufficient to safely interrupt the power supply in the event of a fault. If the degree of protection is unknown, an external safety switch (e.g. 8JD 743 557-021) must also always be used. If water gets in, incorrect protection can lead to damage ranging from melting to burning of the product.

90 MM: L 70 BI-LED MODULE, LOW BEAM AND HIGH BEAM

The light colour, which is similar to daylight, offers more safety and comfortable, fatigue-free driving. Three white high-power LEDs provide the light source for each lighting function. The light is projected homogeneously onto the road through the 70 mm DE lens. The service life of the headlamp, generally over 15,000* real operating hours, enables high savings on maintenance and workshop costs compared to other lighting systems**.

Exclusive vehicles stand out due to their cutting-edge technology.

These LED products have the following features:



L70 LED low-beam headlamp and L 70 bi-LED low-beam and high-beam headlamp

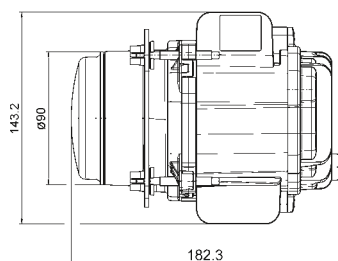
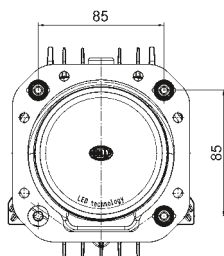
Maintenance-free module for generally more than 15,000 operating hours, very homogenous light and quick start time, 35 W power consumption, no moving parts, passive cooling, plastic cover lens, vehicle protection: 5 A, multivolt 9–32 V.

Mono LED, right-hand traffic	1BL 010 820-001
Mono LED, left-hand traffic	1ML 010 820-011
Bi-LED, right-hand traffic	1AL 010 820-021
Bi-LED, left-hand traffic	1LL 010 820-031

Type approval: Mono LED ES 3159 and LES 3160,
bi-LED ES 3351 and LES 3352

Accessories

Function monitoring device 12 V, for failure monitor	5DS 011 630-001
Carrier frame	9AH 169 580-011



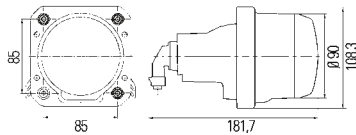
* at an ambient temperature of around 50°C.

** In the ECE R48 area of application, under current law, it is necessary to implement failure check for a LED headlamp in the vehicle's electrical system by taking suitable measures. Failure check is no longer necessary from 06/2014 onwards for vehicles in accordance with ECE-R48 Series 06 Supplement 3.

A 3A fuse from HELLA must be used for all LED headlamps. A fuse of >3A is not sufficient to safely interrupt the power supply in the event of a fault. If the degree of protection is unknown, an external safety switch (e.g. 8JD 743 557-021) must also always be used. If water gets in, incorrect protection can lead to damage ranging from melting to burning of the product.

90 MM PREMIUM LOW BEAM AND HIGH BEAM

High-end illumination. Low beam and high beam from a single headlamp module, choice of xenon or halogen technology. 70 mm DE lens. Pattern-free and hardened glass cover lens. High-quality aluminium reflector. Pre-assembled adjusting screws. Including light source. For xenon variants splash-proof electronic ballast. Connection using 0.5 m shielded supply cable with detachable plug connection.

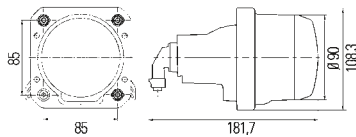


Bi-Halogen® HEADLAMP Low beam and spotlight

Halogen, low beam and high beam in one headlamp, metal reflectors with a clear DE lens. Ideal in combination with the matching spotlights and fog lights. Inc. light source.

12 V, right-hand traffic, H7, ECE	1AL 009 998-001
12 V, left-hand traffic, H7, ECE	1LL 009 998-011
12 V, right-hand traffic, H9, SAE	1AL 009 998-021
24 V, right-hand traffic, H7, ECE	1AL 009 998-041
24 V, left-hand traffic, H7, ECE	1LL 009 998-051

Type approval: 2484 and 2485



Halogen low-beam headlamp

Metal reflectors with clear DE lens. Ideal in combination with the matching spotlights and fog lights, including light source.

12 V, right-hand traffic, H7, ECE	1BL 009 999-001
12 V, left-hand traffic, H7, ECE	1ML 009 999-011
12 V, right-hand traffic, H7, SAE	1BL 009 999-021
24 V, right-hand traffic, H7, ECE	1BL 009 999-041
24 V, left-hand traffic, H7, ECE	1ML 009 999-051

Type approval: 2486 and 2487

Information

If you have been using Classic modules so far (except Bi-Xenon®), you can easily upgrade these to Performance modules.

The following Performance modules have the same module attachment as the Classic module and are therefore compatible and easy to replace – without having to modify the existing Classic carrier frame structure first.

Do you want to combine modules from the Premium and Performance series, without having to decide on a vehicle design from the very beginning?

Then use the tried-and-trusted Premium carrier frame structure as a basis.

Alongside the complete Premium range, the following modules from the Performance series that are compatible with a Premium carrier frame can also be used.

Classic mounting for Performance headlamps

90 mm high beam with PO, 12 V light bulb	1KO 247 043-157
90 mm high beam with 12 V light bulb	1KO 247 043-167
90 mm spotlight 12 V bulb, Right-hand traffic	1BL 247 042-217
Left-hand traffic	1ML 247 042-227

24 V versions available upon request

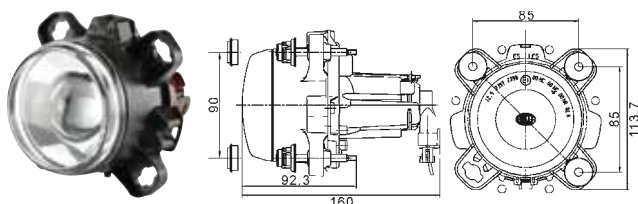
Premium mounting for Performance headlamps

90 mm high beam with PO, 12 V light bulb	1KO 247 043-117
90 mm high beam with 12 V light bulb	1KO 247 043-127
90 mm spotlight 12 V bulb, Right-hand traffic	1BL 247 042-177
Left-hand traffic	1ML 247 042-187

24 V versions available upon request

90 MM PERFORMANCE LOW BEAM AND HIGH BEAM

Optimised illumination. Modules in enhanced quality for use on long hauls. Pattern-free and hardened glass cover lens. High-quality aluminium reflector. With splashwater-proof plug connector. Perfectly fitting adjustment screws included in the scope of supply. Including light source. 24 V versions incl. heavy-duty longlife bulbs. Low beam with 50 mm DE lens, high beam with FF reflector.



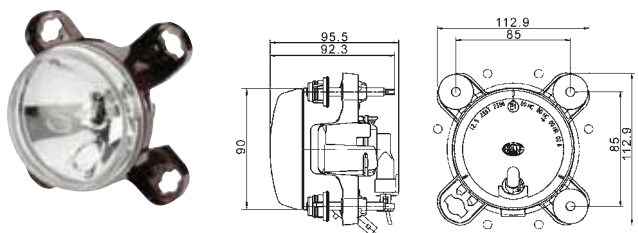
Halogen low-beam headlamp

Module headlamp with an aluminium reflector and clear DE lens behind a non-patterned glass cover lens, incl. light source.

12 V, right-hand traffic, H1, for Performance mounting	1BL 247 042-007
12 V, left-hand traffic, H1, for Performance mounting	1ML 247 042-027
12 V, right-hand traffic, H1, for Premium mounting	1BL 247 042-177
12 V, left-hand traffic, H1, for Premium mounting	1ML 247 042-187
24 V, right-hand traffic, H1, for Premium mounting	1BL 247 042-197
24 V, left-hand traffic, H1, for Premium mounting	1ML 247 042-207
24 V, right-hand traffic, H1, for Classic mounting	1BL 247 042-157
24 V, left-hand traffic, H1, for Classic mounting	1ML 247 042-167

Type approval: E 2397 and E 2398

¹⁾ With a technical solution for tourists for temporary use in left-hand traffic countries or, for left-hand traffic versions, in right-hand traffic countries.



Halogen high-beam headlamp

Module headlamp with an aluminium free-form reflector and a non-patterned glass cover lens, incl. light source.

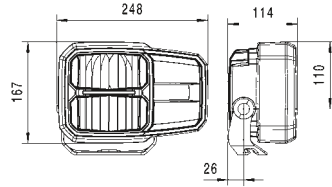
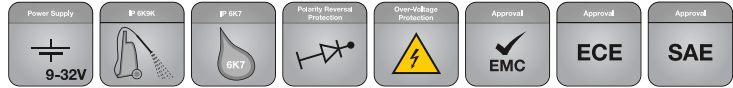
12 V, with position light, H1, for Performance mounting	1K0 247 043-007
12 V, without position light, H1, for Performance mounting	1K0 247 043-117
12 V, with position light, H1, for Premium mounting	1K0 247 043-117
12 V, without position light, H1, for Premium mounting	1K0 247 043-127

Type approval: E 2397

24 V, with position light, H1, for Premium mounting	1K0 247 043-137
24 V, without position light, H1, for Premium mounting	1K0 247 043-147
24 V, with position light, H1, for Classic mounting	1K0 247 043-097
24 V, without position light, H1, for Classic mounting	1K0 247 043-107

Type approval: E 2397 and E 2398

This LED product has the following features:

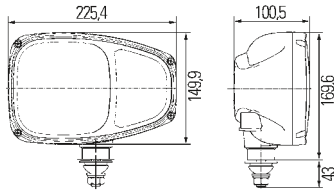


C140 LED headlamp

Combination headlamp with all functions in LED technology. For horizontal or vertical mounting, with aluminium die-cast housing, scratch-proof polycarbonate lens, with 6-pin DT connector, lighting functions: low beam, high beam, position light, and direction indicator.

Vertical mounting	1EE 996 374-001
Horizontal mounting on the left	1EE 996 374-011
Horizontal mounting on the right	1EE 996 374-021

Type approval: Ⓜ 4079 / SAE



Headlamp C 220

For surface mounting with H7 low beam, H3 high beam, position light with integrated indicator light to front and rear (category 1, 1a and 5), with 6-pole DT connector, light exit 120 mm x 120 mm.

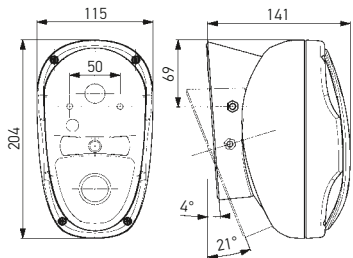
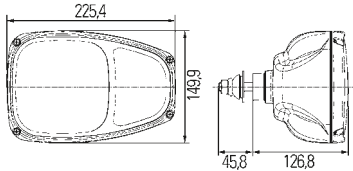
Upright mounting

12 V, left	1EE 996 174-251
12 V, right	1EE 996 174-261
24 V	on request

Central mounting

12 V, left	1LE 996 174-211
12 V, right	1EE 996 174-221

Type approval: Ⓜ 6556, 11372, and 11373

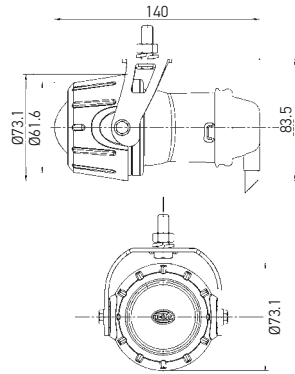


Halogen combination headlamp

For mounting (on vertical surfaces), with H7 low-beam light with integrated direction indicator and position light, housing made from glass-fibre reinforced plastic, lens made from hardened glass, with 4-pin DT connector.

12 V	1BR 996 171-101
24 V	1BR 996 171-111

Type approval: Ⓜ 12666

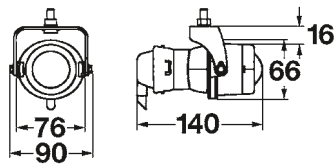


Micro DE PREMIUM EDITION: FOG LIGHT

Individual fog lamp, with 12 V H3 bulb, aluminium design trim.

1NL 008 090-301

Type approval: \odot 877, ECE-R19 B series 02 and B series 03



Micro DE FOG LIGHT

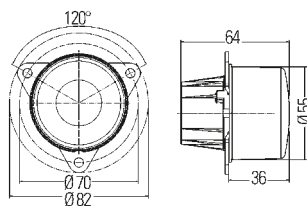
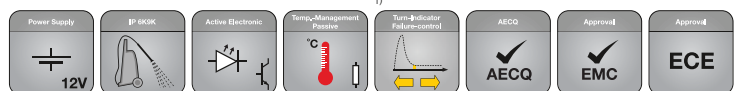
Fog light with black decorative ring.

Set 1NL 008 090-821

Individual 1NL 008 090-031

Type approval: \odot 877, ECE-R19 B series 02, B series 03

This LED product has the following features:



Modular LED light, \varnothing 55 mm

For front installation, clear lens with optics and a 500 mm connecting cable.

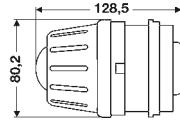
Indicator light, without pulse 2BA 011 172-001/7

Indicator light, with pulse 2BA 011 172-011/7¹⁾

Position lamp with heat sink in progress

Type approval: \odot 3284 and CCC (BL)

ECE: distance < 40 mm to the low-beam headlamp/fog lamp

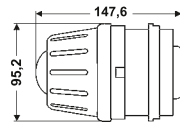


50 mm Premium low-beam headlamp

Installation frame for 3-point attachment, adjustable from the front and rear.

12 V, right-hand traffic, H7	1BL 009 071-007
12 V, left-hand traffic, H7	1ML 009 071-017
24 V, right-hand traffic, H7	1BL 009 071-027
24 V, left-hand traffic, H7	1ML 009 071-037

Type approval: 1903 and 1904

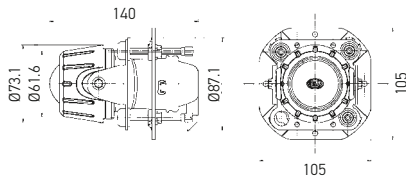


50 mm Premium spotlight

3-point holder, adjustable using adjustment screw. With ECE and SAE type approval.

12 V, H9	1KL 009 486-001
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Type approval: 2198



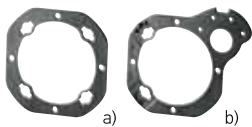
50 mm Premium fog light

3-point holder, adjustable using adjustment screw, back carrier frame not included in delivery (see Accessories). With ECE and SAE type approval.

12 V, H7	1NL 008 090-317
24 V, H7	1NL 008 090-327

Type approval: 877, ECE-R19 B series 02, B series 03

Accessories



Carrier frame (not for H9 halogen spotlights)

a) without HLL holder	9AH 161 786-017
b) with HLL holder	9AH 161 784-017



Plastic cap (rubber cap)

a) for halogen low beam headlamps	9GH 152 654-007
b) for fog lights	9GH 147 009-007



Connector plug set

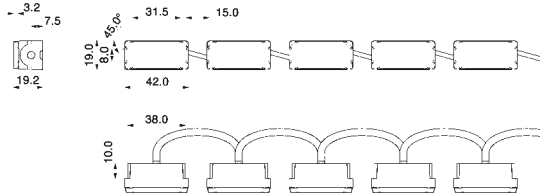
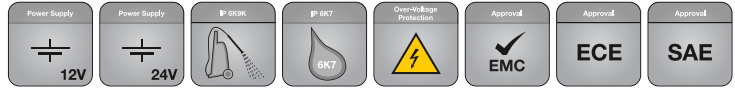
Rubber cap for 20 headlamps	8JD 156 150-807
H9 plug for 20 headlights (not shown)	8JD 158 175-807



Actuator motors for headlight range adjustment

for 12 V Halogen	6NM 007 282-221
24 V actuator	6NM 008 299-501
Actuator assembly set	8HG 183 586-001

This LED product has the following features:



LEDDayFlex II rectangular

Module chain with 5 or 6 modules, cable length: approx. 80 mm between the individual modules, 2 high-power LEDs per individual module.

Module chain with 5 light modules

Daytime running light/position light, 12 V	2PT 980 789-051
Daytime running light/position light, 24 V	2PT 980 789-051* 2PT 980 789-061*

Module chain with 6 light modules

Daytime running light/position light, 12 V	2PT 980 789-251
Daytime running light/position light, 24 V	2PT 980 789-251* 2PT 980 789-261*

Type approval: ☺ / SAE

Necessary accessories for module chains

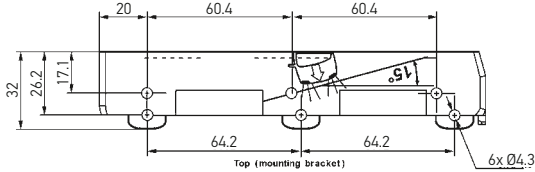
12 V control unit with connecting cables	8KA 959 186-901
24 V control unit with connecting cables	8KA 959 186-911

* For 24 V operation, please observe the requirements as per the installation guide: the lamps are wired in series. You must order both articles for this!

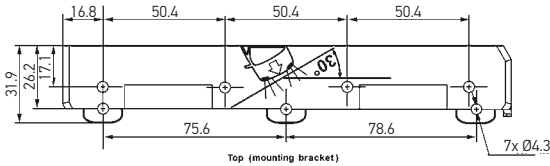
This LED product has the following features:



LEDDayLine 15



LEDDayLine 30



LEDDayLine 15 and LEDDayLine 30 with position light

2 versions for horizontal installation in various vehicle fronts, 8 LEDs per daytime running light.

LEDDayLine 15

suitable for vehicles with 15° angle at installation location.

Light module daytime light/position light 12 V	2PT 980 860-001
Light module daytime light/position light 24 V	2PT 980 860-501
Brackets (set right/left)	8HG 980 864-101

LEDDayLine 30

suitable for vehicles with 30° angle at installation location.

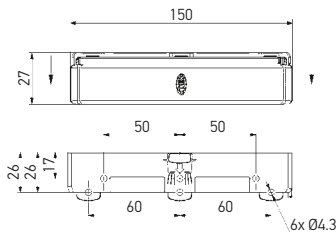
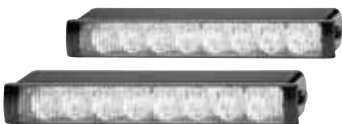
Light module daytime light/position light 12 V	2PT 980 850-001
Light module daytime light/position light 24 V	2PT 980 850-501
Brackets (set right/left)	8HG 980 854-101

Type approval: ECE / SAE

Control units

12 V with connecting cables	8KA 959 186-801
24 V with connecting cables	8KA 959 186-811

This LED product has the following features:



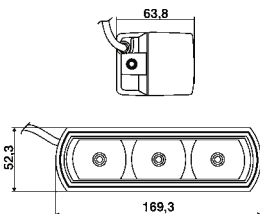
LEDDayLine Zero

2 light modules for horizontal installation, suitable for vehicles without sweep angle, 8 high-power LEDs per daytime running light.

12 V daytime running light	2PT 980 970-821
24 V daytime running light	2PT 980 970-871

Type approval: ☺ 5875

This LED product has the following features:



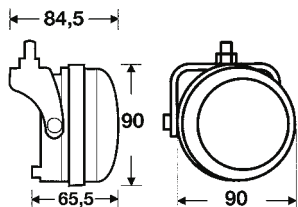
LED daytime running light set, rectangular design

2 lights incl. harness, universal bracket,
3 high-power LEDs per light, multivolt 9-33 V.
12 V / max. 5.5 W, current consumption = 2.18 A

Set for surface mounting	2PT 009 496-801
Individual light without bracket, DRL with PO function	2PT 009 496-007

Type approval: E 2344

This LED product has the following features:



LED daytime running lights set, round design

2 lights incl. harness, universal bracket,
3 high-power LEDs per light, multivolt 9-33 V.
12 V / max. 5.5 W, current consumption = 2.18 A

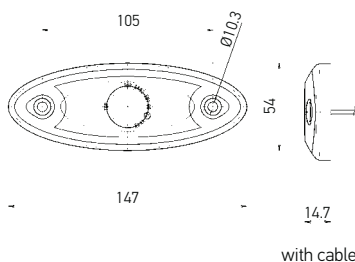
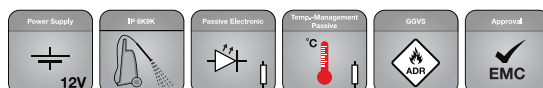
Set for surface mounting	2PT 009 599-811
Daytime running light with position light, left	2PT 009 559-131
Daytime running light with position light, right	2PT 009 599-141

Type approval: E 2372

Optional accessories

Universal carrier frame	9AH 165 968-001
Wiring harness, pre-assembled	8KA 165 959-001

This LED product has the following features:



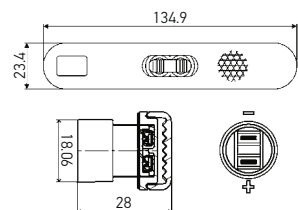
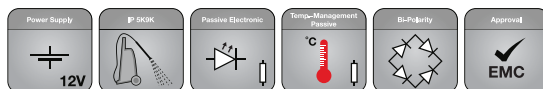
LED position light

For horizontal surface mounting, with 500 mm cable, modern night-time design and high level of safety thanks to maximum illumination area.

12 V	2PG 344 690-307
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Type approval: ECE E 5853

This LED product has the following features:

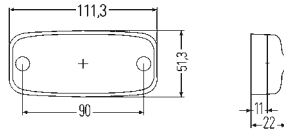


LED position light

For surface mounting, self-adhesive with 6.3 mm contacts and counterplug grommet.
Current consumption = 0.04 A

12 V	2PF 009 226-097
Counterplug grommet (order separately)	9GT 186 597-007

This LED product has the following features:



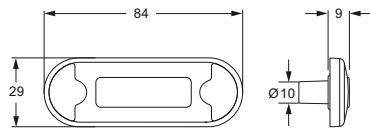
LED position light

For horizontal mounting left/right.
Current consumption = 0.02 A

500 mm potted cable, open end	2PG 345 600-401
5,000 mm potted cable, open end	2PG 345 600-411

Type approval: E17 0002

This LED product has the following features:



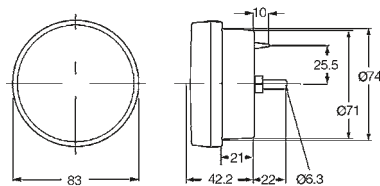
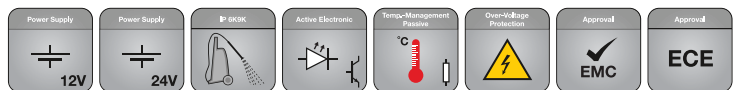
DuraLED position light

For horizontal/ vertical mounting.
Current consumption = 0.02 A

500 mm cable, black end caps	2PF 959 855-201
2,500 mm cable, black end caps	2PF 959 855-241
500 mm cable, white end caps	2PF 959 855-251

Type approval: E29 5878

This LED product has the following features:



83 mm LED-3 functional light

Daytime light, position light, and direction indicator, pre-wired with 2.5 m sheathed four-core cable.

12 V, single lamp	2BE 980 691-101
24 V, single lamp	2BE 980 690-101

Type approval: E29 5854 and E03 1962, direction indicator ECE reg. no. 6, position light ECE reg. no. 7, daytime running light ECE reg. no. 87

Optional accessory: Adapter ring 90 mm

The adapter ring is used to replace a 90 mm light with the 83 mm light. This means that vehicles already equipped with a HELLA 90 mm light can be easily converted for the 83 mm light.

9GD 980 696-001

More than a combination of 5 functions

These days, LEDs are key: Not only are they taking the automotive industry by storm due to their energy-saving potential, they also offer a level of design versatility that is crucial to developing a vehicle's typical appearance. For rear combination lamps especially, manufacturers are making ever greater use of the many options available when LEDs are combined with optical systems, creating attractive and distinctive vehicle designs.

The HELLA patented system for monitoring the turn indicator gives HELLA lights the ability to be used in conjunction with the HELLA ballast in accordance with ECE-R48. The lights are currently designed so that no error message is displayed in the vehicle's electrical system. Inverse-polarity protection ensures that the light is not damaged due to accidental contact of the poles. In order to lengthen the service life, all HELLA light components have been matched optimally in terms of temperature to prevent overloading the LEDs in high environmental temperatures. The lights are designed for the service life of a vehicle and are therefore an outstanding, economical and environmentally friendly solution.

SHAPELINE
DESIGN YOUR LIGHT

www.hella.com/shapeline

CUSTOMISED LIGHT DESIGN!

The variety and range of shapes and the various combination options paired with a technically optimised product design make the new Shapeline lamp series a true innovation in vehicle lighting.

Whether on the front, side or rear end of a vehicle, every vehicle series – whether big or small – can have a unique and, above all, consistent look using a customised configuration and arrangement of lamps. This allows us to meet the demands of vehicle manufacturers with lower numbers of manufactured vehicles.

Along with innovative technology and the familiar high quality of HELLA's products, the variety of shapes of Shapeline lamps provide you with nearly infinite design freedom.

The modular HELLA Shapeline product range provides a variety of different light functions that can be combined with each other individually. Here, all lamps are available in two different designs: The classic straight-line Shapeline Tech design and the dynamic curved Shapeline Style design.

Tech or Style: The HELLA Shapeline series provides design freedom for nearly any application and vehicle, and achieves a consistent light signature for your vehicle at the same time.

Design your light – with HELLA Shapeline!



Premium Design



Flexible



Robust



Simple and safe



ECE and SAE



Multi-voltage

Design freedom at the click of a mouse

The HELLA Shapeline online configuration tool turns you into a lighting designer: With a few clicks, make your own vehicle light design for the front, sides, and rear end – and see the result directly after, as applied convincingly to a car outline.

www.hella.com/shapeline

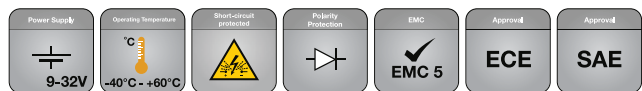


SHAPELINE PRODUCT OVERVIEW

The modular HELLA Shapeline product range provides a variety of different light functions that can be combined with each other individually. Here, all lamps are available in two different designs: The classic straight-line Shapeline Tech design and the dynamic curved Shapeline Style design.

Tech or Style: The HELLA Shapeline series provides design freedom for nearly any application and vehicle, and achieves a consistent light signature for your vehicle at the same time.

These LED products have the following features:



Shapeline position lights

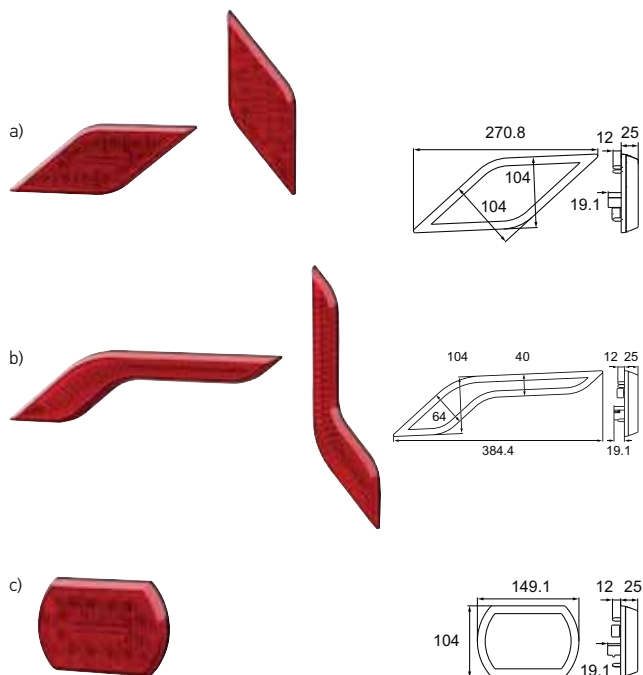
Position lights, Style Design

a) Position light, small 2SA 013 324-XXX*

Position light, Tech Design

b) Position light, small 2SA 013 323-XXX*

These LED products have the following features:



Shapeline tail stop lights

Tail stop lights, Style Design

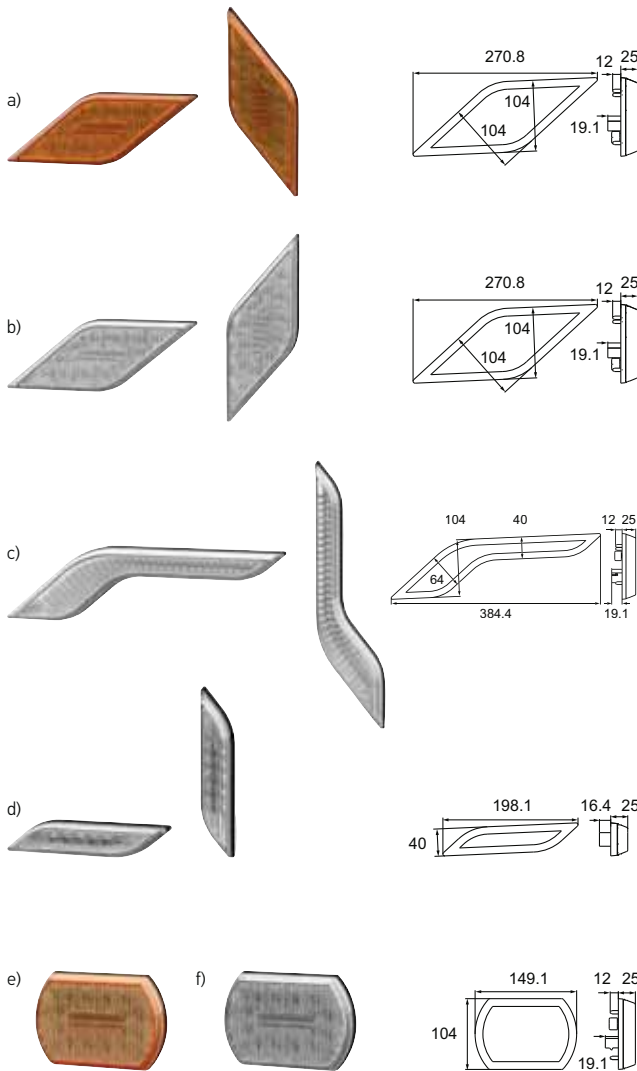
a) Tail stop light 2SB 013 342-XXX*

b) Tail stop light, wing 2SB 013 399-XXX*

Tail stop lights, Tech Design

c) Tail stop light 2SB 013 341-XXX*

These LED products have the following features:



Shapeline direction indicators

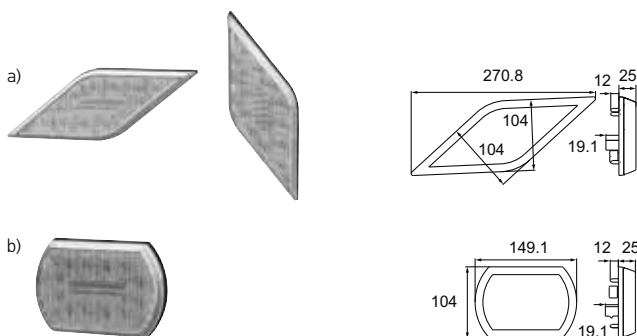
Direction indicators, Style Design

a) Direction indicator, yellow	2BA 013 331-XXX*
b) Direction indicator, clear	2BA 013 331-XXX*
c) Direction indicator, wing	2BA 013 333-XXX*
d) Direction indicator, slim	2BA 013 332-XXX*

Direction indicators, Tech Design

e) Direction indicator, yellow	2BA 013 330-XXX*
f) Direction indicator, clear	2BA 013 330-XXX*

These LED products have the following features:



Shapeline tail light/stop light/direction indicators

Tail light/stop light/direction indicator, Style Design

a) Tail light/stop light/direction indicator	2SD 013 342-XXX*
----------------------------------------------	------------------

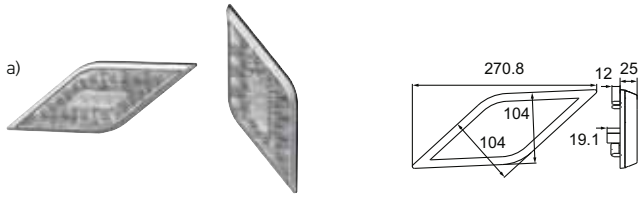
Tail light/stop light/direction indicator, Tech Design

b) Tail light/stop light/direction indicator	2SD 013 341-XXX*
----------------------------------------------	------------------

* Please see our Shapeline brochure for a detailed overview of all part numbers and versions. Alternatively, with the HELLA Shapeline online configuration tool you are just a few clicks away from your own fully customised vehicle light design for the front, sides, and rear end: www.hella.com/shapeline.

SHAPELINE
DESIGN YOUR LIGHT

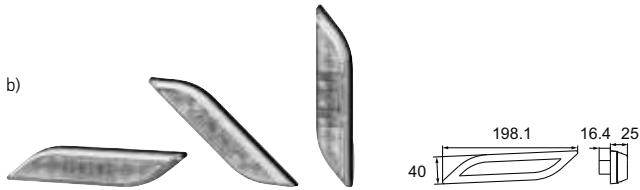
These LED products have the following features:



Shapeline reverse lights

Reverse lights, Style Design

a) Reverse light	2ZR 013 345-XXX*
b) Reverse light, Slim	2ZR 013 401-XXX*



Reverse light, Tech Design

c) Reverse light	2ZR 013 344-XXX*
------------------	------------------



This LED product has the following features:



Shapeline warning lights

Warning light, Style Design

a) Warning light	2XW 013 493-XXX*
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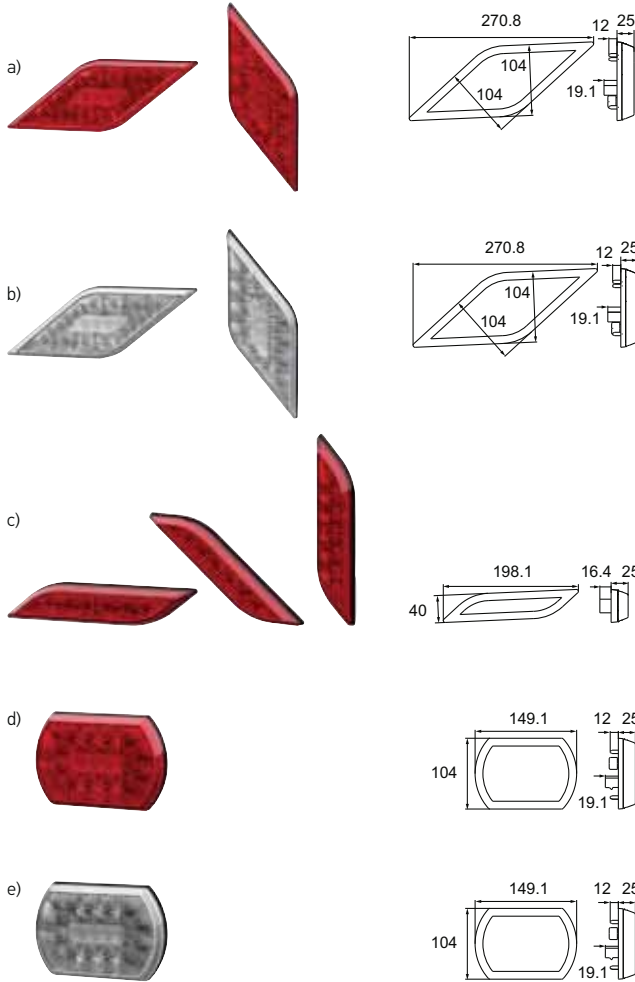


Shapeline design element

Style Design

a) Design element	2XX 013 349-XXX*
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These LED products have the following features:



Shapeline rear fog lamps

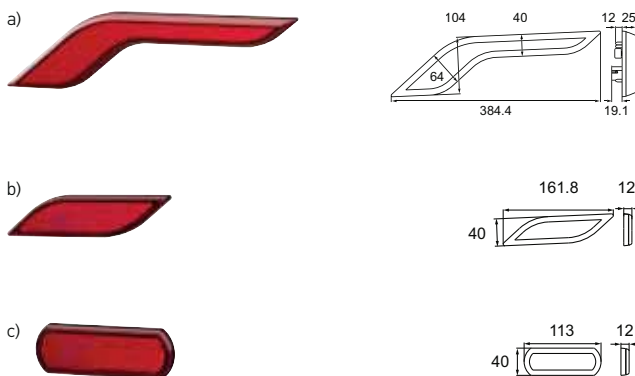
Rear fog lamps, Style Design

a) Rear fog lamp	2NE 013 345-XXX*
b) Rear fog /reverse light	2NR 013 345-XXX*
c) Rear fog lamp, slim	2NE 013 343-XXX*

Rear fog lamps, Tech Design

d) Rear fog lamp	2NE 013 344-XXX*
e) Rear fog /reverse light	2NR 013 344-XXX*

These LED products have the following features:



Shapeline reflex reflector

Reflex reflector, Style Design

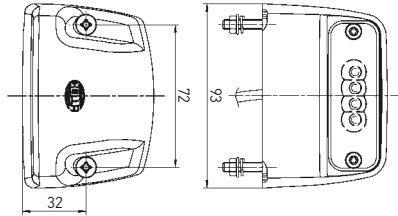
a) Reflex reflector, wing	8RA 013 402-XXX*
b) Reflex reflector	2RA 013 347-XXX*

Reflex reflector, Tech Design

c) Reflex reflector	8RA 013 403-XXX*
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* Please see our Shapeline brochure for a detailed overview of all part numbers and versions. Alternatively, with the HELLA Shapeline online configuration tool you are just a few clicks away from your own fully customised vehicle light design for the front, sides, and rear end: www.hella.com/shapeline.

This LED product has the following features:



LED licence plate light

12 V, for surface mounting on the right or left of the licence plate, with 4 LEDs, clear lens, housing made of black synthetic material, with CE and ECE type approval, with blade terminal 6.3 x 0.8.
12 V / 1 W, current consumption = approx. 0.08 A

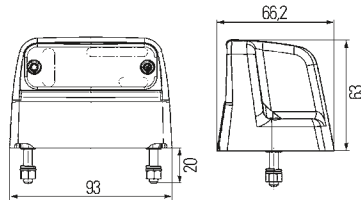
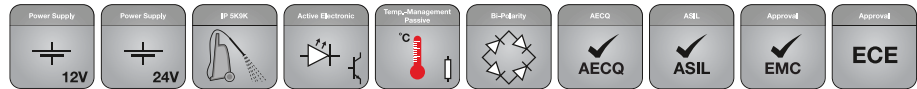
for 520 x 120 mm licence plates, only 1 light required for illumination **2KA 010 278-321**

Type approval: 2609

for 340 x 240 and 280 x 200 mm licence plates **2KA 010 278-421**

Type approval: 2911

This LED product has the following features:



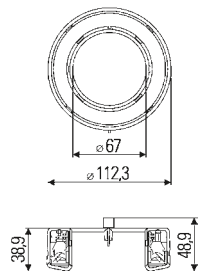
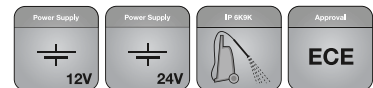
LED licence plate light

2 LEDs, for mounting on left and right, power consumption 0.3–0.5 W, service life 40,000 hours, operating temperature: -40°C to +85°C, ADR.

12 / 24 V, 500 mm cable, EasyConn **2KA 012 271-057**

Type approval: 0032, 10R-047294

This LED product has the following features:



LED circular ring module Ø 112 mm

Tail light/stop light, technological further development: LED edge light technology, ECE approval, ideal for combinations with light series 009 001 (Ø 66 mm), 1:1 replacement with light series 009 362, 12 V or 24 V.

Tail light/stop light, 12 V, red **2SB 009 362-301**

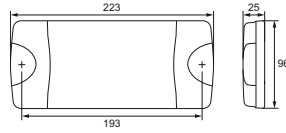
Tail light/stop light, 24 V, red **2SB 009 362-321**

Tail light/stop light, 12 V, clear **2SB 009 362-311**

Tail light/stop light, 24 V, clear **2SB 009 362-331**

Type approval: 7R-025889

This LED product has the following features:



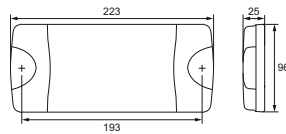
DuraLED Combi multifunction light

Multi-function light DuraLED Combi – program extension, maintenance-free, hermetically fully sealed, impact-resistant and long-time UV resistance, slim design with an installation height of just 25 mm, dual volt 12 / 24 V, with 2,500 mm cable, stop light = 8 red LEDs (4 LEDs with reduced light output for tail light), direction indicator = 8 yellow LEDs, with reflex reflector.

12 V / 24 V DC	2VA 980 710-061
24 V DC	2VA 980 710-301

Type approval: 5882, GGVS / ADR

This LED product has the following features:



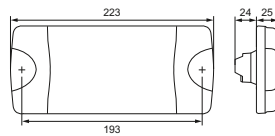
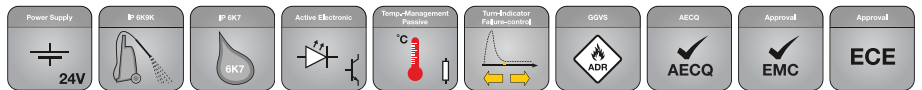
DuraLED Combi multifunction light

Dual volt 12 / 24 V, tail light/stop light/direction indicator, for horizontal/vertical mounting, with pulse for direction indicator failure monitor, stop light = 18 red LEDs (6 LEDs with reduced light output for tail light), direction indicator = 12 yellow LEDs, lens colour clear, ends decorated red.

12 / 24 V DC, with integrated 6-pin DEUTSCH connector (mating connector to be used DT 06-6S)	2SD 980 602-211
12 / 24 V DC, with 2,500 mm cable	2SD 980 613-211

Type approval: 5883, GGVS / ADR

This LED product has the following features:



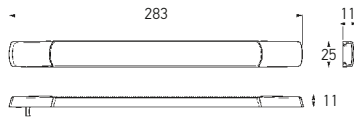
DuraLED Combi multifunction light

Multi-function light DuraLED Combi – program extension, maintenance-free, hermetically fully sealed, impact-resistant and long-time UV resistance, slim design with an installation height of just 25 mm, dual volt 12 / 24 V, with integrated 6-pin DEUTSCH connector (mating connector to be used DT 06-6S), tail light/stop light = 6 red LEDs, direction indicator = 6 yellow LEDs, reverse light = 6 white LEDs.

24 V DC	2SK 980 602-501
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Type approval: 5894, GGVS / ADR

This LED product has the following features:



LED signal light

For 12 and 24 V, for horizontal and vertical mounting, with 10 LEDs.

			ECE	SAE (USA)
12 V				
Rear direction indicator without pulse for direction indicator failure monitor, with 2,500 mm cable	2BA 980 888-011	③	X	
Stop light/tail light, with 300 mm cable	2SB 980 887-011	①②	X	
Additional stop lamp, with 2,500 mm cable	2DA 980 887-311	②	X	
Rear fog lamp, with 2,500 mm cable	2NE 980 889-501	④	X	
Reversing light, horizontal mounting, with 2,500 mm cable	2ZR 980 889-011	⑤	X	
Reversing light, vertical mounting, with 2,500 mm cable	2ZR 980 889-111	⑤	X	

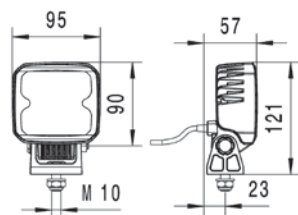
Type approval:

24 V

Rear direction indicator without pulse for direction indicator failure monitor, with 2,500 mm cable	2BA 980 888-211	③	X	
Stop light/tail light, with 300 mm cable	2SB 980 887-211	①②	X	
Additional stop lamp, with 2,500 mm cable	2DA 980 887-411	②	X	
Rear fog lamp, with 2,500 mm cable	2NE 980 889-601	④	X	
Reversing light, horizontal mounting, with 2,500 mm cable	2ZR 980 889-211	⑤	X	
Reversing light, vertical mounting, with 2,500 mm cable	2ZR 980 889-311	⑤	X	

Type approval:

This LED product has the following features:



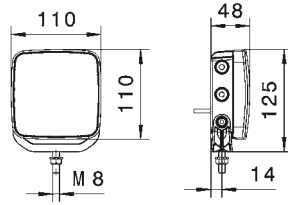
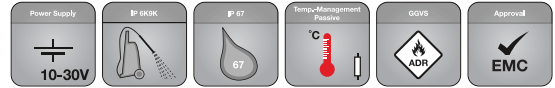
Q90 Compact LED Reversing Light

1,000 lumens, power requirement: 15 W, colour temperature: 6,500° Kelvin, heat-conducting plastic housing, total corrosion protection thanks to Thermo Pro technology, mounting upright/pendant.

2,000 mm cable	2ZR 996 284-501
500 mm cable and DT connector, ADR / GGVSEB-tested	2ZR 996 284-511

Type approval: ECE-R23, ECE-R10

This LED product has the following features:



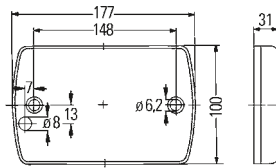
Repulse Pro

870 lumens, power requirement: 11 W, colour temperature: 5,500° Kelvin, heat-conducting plastic housing, total corrosion protection thanks to Thermo Pro technology, mounting upright/pendant.

AMP-SUPERSEAL connector (2-pole) with 2,000 mm cable	2ZR 012 456-201
EasyConn connector (2-pin) with 1,000 mm cable	2ZR 012 456-211
6.3 mm flat receptacles with 3,000 mm cable	2ZR 012 456-221

Type approval: ECE-R23, ECE-R10

This LED product has the following features:



Tail, stop, direction indicator light with reflex reflector

For 12 and 24 V, for horizontal and vertical surface mounting, with 8 LEDs, clear lens, 500 mm cable with stripped ends and adhesion bonded red reflector. Detachable black retaining frame with 4 holes Ø 4.2 mm and 2 holes Ø 5.0 mm for fixing screws. Without pulse for indicator failure check.

12 V/5 W, current consumption = 0.42 A			
24 V/5 W, current consumption = 0.21 A			
12 / 24 V	2VA 980 720-001	X	
12 / 24 V	2VA 980 720-007	X	

With licence plate lighting for 370 x 120 mm and 520 mm x 120 mm plates, for horizontal surface mounting only.

Indicator light at top, licence plate light on left			
12 / 24 V, with DT connector	2VB 980 720-401	X	
12 / 24 V, with DT connector	2VB 980 720-407	X	
Indicator at bottom, licence plate light on left			
12 / 24 V, with 500 mm cable	2VB 980 720-501	X	
12 / 24 V, with 500 mm cable	2VB 980 720-507	X	

Type approval: 5860, 03 2079, EMC

Possible uses

12 / 24 V, LED flasher	4JZ 177 846-007
Female connector housing	8JA 003 526-001

ECE note: Turn indicator approval by category

D ECE approval as twin indicators

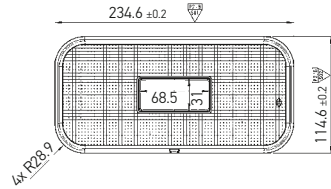
SAE type approval for vehicles

- < 2032 mm wide
- > 2031 mm wide

- ① Tail light
- ② Stop light
- ③ Direction indicator
- ④ Rear fog light
- ⑤ Reverse light
- ⑥ Reflex reflector
- ⑦ Side marker light with reflex reflector
- ⑧ Licence plate light
- ⑨ Position light

Please see the note on page 92 regarding LED direction indicators and LED light failure monitor.

This LED product has the following features:



Full LED combination rear light

For horizontal surface mounting, tail/stop light with 6 red LEDs reduced light output of tail lamp, indicator light with 6 amber LEDs. With integrated 4-pole DT connector DT 04-4P. With pulse for indicator failure check.

ECE SAE (USA)

12 V/3.3 W, current consumption = approx. 0.28 A
24 V/4.5 W, current consumption = approx. 0.19 A

12 V	2VA 011 900-001	①②③⑥	X
24 V	2VA 011 900-021	①②③⑥	X

Type approval: Ⓔ 5878, Ⓔ 10R 04 6919, EMC

This LED product has the following features:



Full LED combination rear light

For horizontal surface mounting, tail/stop lamp with 6 red LEDs reduced light output in tail lamp, indicator light with 6 amber LEDs. With integrated 4-pole DT connector DT 04-4P. Without pulse for indicator failure check.

ECE SAE (USA)

12 V/3.3 W, current consumption = approx. 0.28 A
24 V/4.5 W, current consumption = approx. 0.19 A

12 V	2VA 011 900-011	①②③⑥	X
24 V	2VA 011 900-031	①②③⑥	X

Type approval: Ⓔ 5878, Ⓔ 10R 04 6919, EMC

This LED product has the following features:



Full LED combination rear light

For horizontal surface mounting, tail/stop lamp with 6 red LEDs, reduced light output in tail lamp, indicator light with 6 red LEDs. With integrated 4-pole DT connector DT 04-4P. Without pulse for indicator failure check.

ECE SAE (USA)

12 V/5.9 W, current consumption = approx. 0.49 A

12 V	2VA 011 900-041	①②③⑥	●
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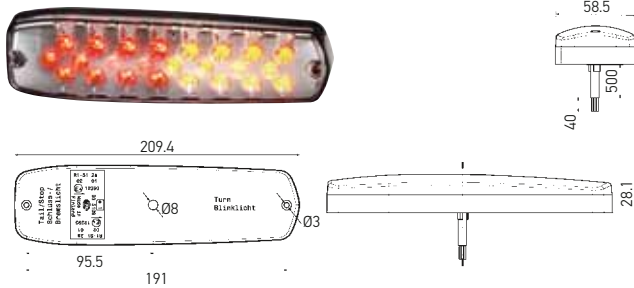
Usable harness assemblies

Harness assembly with 4-pole DT connector DT 06-4S for connection to the lamp.

With 200 mm cable, plus 4-pole AMP-SUPERSEAL connector at other end **8KA 197 041-001**

With 500 mm cable, bare cable ends at other end **8KA 197 041-011**

This LED product has the following features:



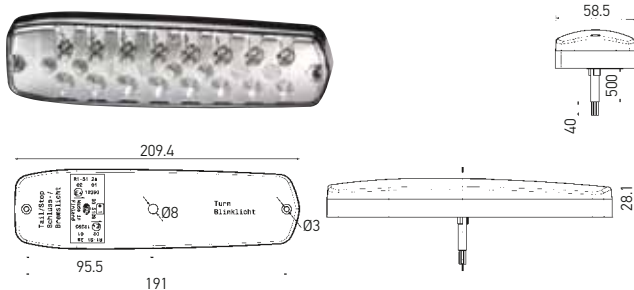
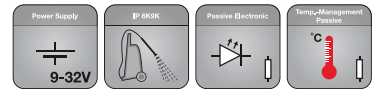
LED tail light stop light direction indicator

For horizontal or vertical surface mounting, with 24 LEDs, clear lens, with ECE and EMC type approval.
 Tail lamp: 12 V/0.5 W, current consumption = approx. 0.04 A
 Stop light: 12 V / 1 W, current consumption = approx. 0.08 A
 Indicator light: 12 V/1.5 W, current consumption = approx. 0.125 A

Multivolt 9 – 32 V, with 200 mm cable and 4-pin AMP connector 282 106-1, mating connector to be used AMP 282 088-1	2SD 343 910-017
With integrated AMP connector 282 106-1 in the housing	2SD 343 910-027
Reflective surface in red, with integrated 4-pin DT connector DT 04-P	2SD 343 910-057

Type approval: E 12393 and E 035109

This LED product has the following features:



LED tail/stop/indicator/reversing light

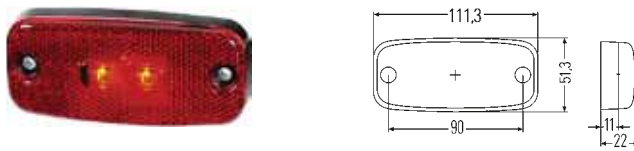
For horizontal or vertical surface mounting, with 24 LEDs, clear lens.
 Tail lamp: 12 V/0.5 W, current consumption = approx. 0.04 A
 Stop light: 12 V / 1 W, current consumption = approx. 0.08 A
 Indicator light: 12 V/1.5 W, current consumption = approx. 0.125 A

	2SK 343 910-037
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Accessories

Flasher (not included in scope of delivery)	4JZ 177 846-007
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This LED product has the following features:



LED rear light

For horizontal mounting, with 2 red LEDs, can be used as a tail light or clearance lamp, 24 V.
 24 V/1.2 W, current consumption = approx. 0.04 A

500 mm cable	2TM 345 600-307
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Type approval: E 9808

ECE note: Turn indicator approval by category

D ECE approval as twin indicators

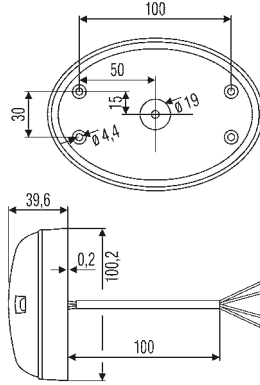
SAE type approval for vehicles

- < 2032 mm wide
- > 2031 mm wide

- ① Tail light
- ② Stop light
- ③ Direction indicator
- ④ Rear fog light
- ⑤ Reverse light
- ⑥ Reflex reflector
- ⑦ Side marker light with reflex reflector
- ⑧ Licence plate light
- ⑨ Position light

Please see the note on page 92 regarding LED direction indicators and LED light failure monitor.

This LED product has the following features:



"Oval" LED combination rear light

For horizontal and vertical surface mounting, clear lens, 24 LEDs, can be used on the right and left, can be turned through 180°, 2 bodywork fastening screws (diagonal arrangement) with 100 mm harness, multivolt 9–32 V. ECE SAE (USA)

2SD 343 390-011¹⁾ ①②③ X

12 red LEDs for stop light:
12 V/1 W, current consumption = approx. 0.08 A

12 red LEDs for tail lamp (reduced output):
12 V/0.2 W, current consumption = approx. 0.02 A

12 amber LEDs for indicator light:
12 V/1.5 W, current consumption = approx. 0.13 A

2BA 343 390-071¹⁾ ③ X

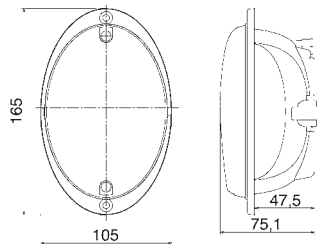
24 amber LEDs for indicator light: 12 V/1.5 W, current consumption = approx. 0.13 A

2SB 343 390-091 ①② X

Stop light: 12 V / 1 W, current consumption = approx. 0.08 A
Tail lamp: 12 V/0.2 W, current consumption = approx. 0.02 A (reduced power)

Type approval: ECE

This LED product has the following features:



"Oval" LED combination rear light

Only for vertical surface mounting, with 24 LEDs, 12 red LEDs for stop light, with 4-pole DT connector integrated in the housing. ECE SAE (USA)

2SD 343 390-401/7 ①②③ X

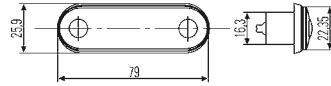
12 red LEDs for stop light:
12 V/1 W, current consumption = approx. 0.08 A

12 red LEDs for stop light (reduced power):
12 V/0.2 W, current consumption = approx. 0.02 A

12 amber LEDs for indicator light:
12 V/1.5 W, current consumption = approx. 0.13 A

Type approval: ECE

This LED product has the following features:



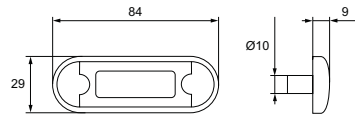
LED clearance light

For horizontal or vertical recessed mounting, clear lens with 2 red LEDs, can be used as tail lamp or end-outline marker lamp, 8-28 V. 12 V/0.5 W, current consumption = approx. 0.04 A

500 mm cable with caps	2XA 959 790-401
5,000 mm cable with caps	2XA 959 790-411

Type approval: E 7597 and 03 1721

This LED product has the following features:



LED clearance light

Multivolt, with 2 white LEDs for horizontal and vertical installation, clear lens, with cap for screw top, black. 12 V/0.5 W, current consumption = approx. 0.04 A

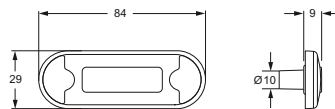
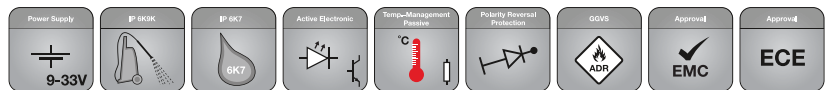
With 500 mm cable	2XS 959 855-407
With 2,500 mm cable	2XS 959 855-447

Type approval: ECE

Accessories

Stainless steel housing, polished	9AB 959 685-201
Cap for screw top, white	9HD 980 858-018

This LED product has the following features:



DuraLED clearance lamp

For horizontal/ vertical mounting. Current consumption = 0.02 A

500 mm cable, black end caps	2XS 959 855-401
2,500 mm cable, black end caps	2XS 959 855-441
500 mm cable, white end caps	2XS 959 855-451

Type approval: E 5878

ECE note: Turn indicator approval by category

D ECE approval as twin indicators

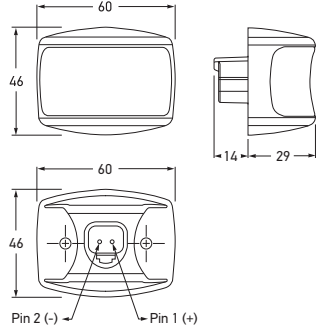
SAE type approval for vehicles

- < 2032 mm wide
- > 2031 mm wide

- ① Tail light
- ② Stop light
- ③ Direction indicator
- ④ Rear fog light
- ⑤ Reverse light
- ⑥ Reflex reflector
- ⑦ Side marker light with reflex reflector
- ⑧ Licence plate light
- ⑨ Position light

Please see the note on page 92 regarding LED direction indicators and LED light failure monitor.

This LED product has the following features:



DuraLED marker light, clearance lamp

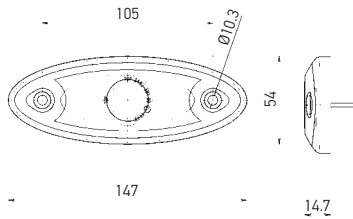
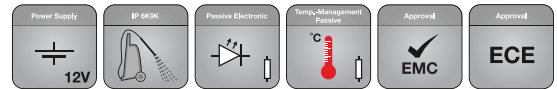
2 LEDs, power consumption <1 W, operating temperature -40°C to +60°C, reverse polarity protection, with 2 screws Ø 4 mm and DT connector.

12 / 24 V

2XS 980 990-621/7

Type approval: 5892, 3195

This LED product has the following features:



LED clearance light

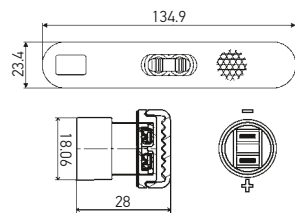
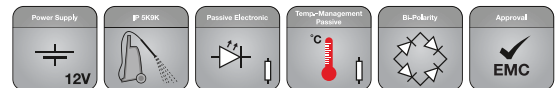
For surface mounting, modern night-time design and high level of safety thanks to maximum illuminated area, 12 V.

500 mm cable, horizontal

2TM 344 690-357

Type approval: 7597 and 03 1721

This LED product has the following features:

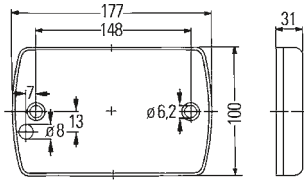


LED clearance light

For horizontal surface mounting, with 2 LEDs, self-adhesive, with 6.3 mm contacts and counterplug grommet.

2XS 009 226-107

This LED product has the following features:

**DuraLED, tail/stop light**

With 24 red LEDs and 2,500 mm cable with stripped ends.
 12 V / 8.5 W = current consumption 0.71 A
 24 V / 8.5 W = current consumption 0.35 A

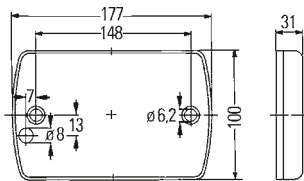
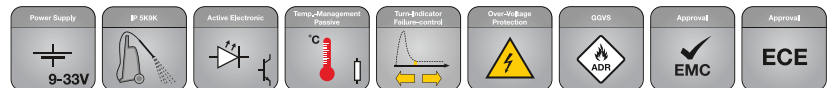
For horizontal mounting

2SB 980 606-201

For vertical mounting

2SB 980 606-701**Type approval:** 5850, EMC, 03 1828

This LED product has the following features:

**DuraLED, INDICATOR**

With 24 amber LEDs and 2,500 mm cable with stripped ends.
 12 V / 4 W, current consumption = 0.33 A
 24 V / 4 W, current consumption = 0.17 A

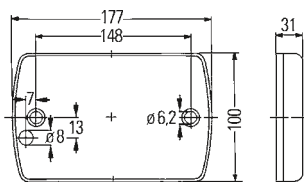
For horizontal mounting

2BA 980 607-201

For vertical mounting

2BA 980 607-701**Type approval:** 5850, EMC, 03 1830

This LED product has the following features:

**DuraLED, BACK-UP LAMP**

With 24 white LEDs and 2,500 mm cable with stripped ends.
 12 V / 4 W, current consumption = 0.33 A
 24 V / 4 W, current consumption = 0.17 A

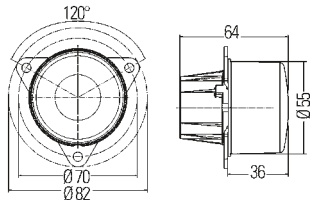
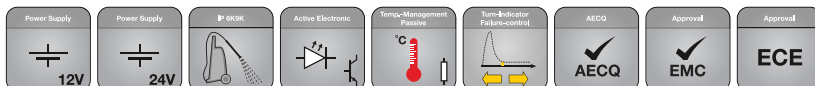
For horizontal mounting

2ZR 980 605-201

For vertical mounting

2ZR 980 605-701**Type approval:** 5850, EMC, 03 1828

This LED product has the following features:



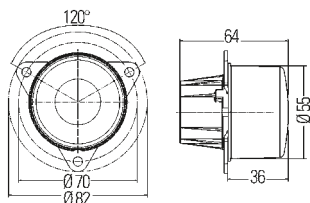
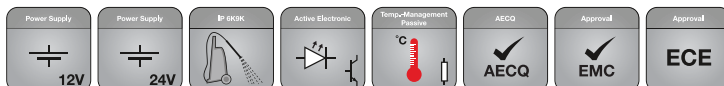
LED rear light/stop light/direction indicator Ø 55 mm

For rear installation, clear lens with optics and 500 mm connecting cable, 12 V / 1.1 W, current consumption = 0.09 A, 24 V / 0.8 W, current consumption = 0.03 A.

12 V, tail light	2SA 011 172-041
12 V, stop light	2DA 011 172-061
12 V, direction indicator, without pulse	2BA 011 172-021
24 V, direction indicator, without pulse	2BA 011 172-421
12 V, direction indicator, with pulse	2BA 011 172-031
24 V, direction indicator, with pulse	2BA 011 172-431

Type approval: 3283, 3284, 10R-036317 and CCC

This LED product has the following features:



LED rear fog and reverse light Ø 55 mm

For rear installation, clear lens with optics and 500 mm connecting cable, 12 V / 2.5 W, current consumption = 0.21 A, 24 V / 1.9 W, current consumption = 0.08 A.

12 V, rear fog lamp	2NE 011 172-081
24 V, rear fog lamp	2NE 011 172-481

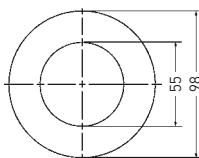
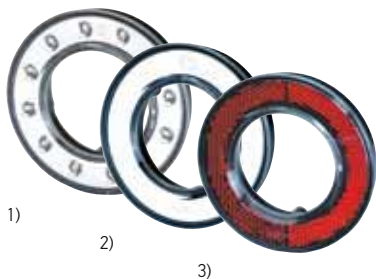
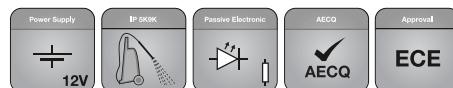
Type approval: 3286, 10R-036317 and CCC



12 V, reverse light	2ZR 011 172-101
24 V, reverse light	2ZR 011 172-501

Type approval: 3285, 10R-036317 and CCC

This LED product has the following features:



LED ring modules Ø 98 mm

12 V, for installation, ideal for combination with light series 011 172 (Ø 55 mm), optionally available with clear or red cover lens.

LED tail clearance lamp, with 12 red LEDs, clear lens

1) 12 V / 1.8 W, current consumption = approx. 0.15 A	2SA 008 405-021
1) 24 V / 1.8 W, current consumption = approx. 0.08 A	2SA 008 405-017

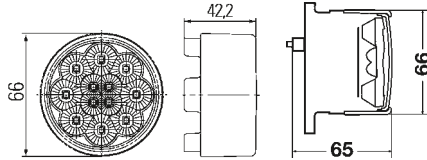
LED tail stop light, with 12 red LEDs, clear lens, with passive thermal management

1) 12 V / 2.1 W, current consumption = approx. 0.15 A	2SB 008 405-101
1) 24 V / 1.8 W, current consumption = approx. 0.08 A	2SB 008 405-091

1) LED position light 12 V / 1.8 W, current consumption = approx. 0.15 A	2PF 008 405-061
2) Chromium-plated cover	8XU 008 405-031
3) Reflex reflector	8RA 008 405-001

Type approval: 1196, 1197 and 1892

This LED product has the following features:

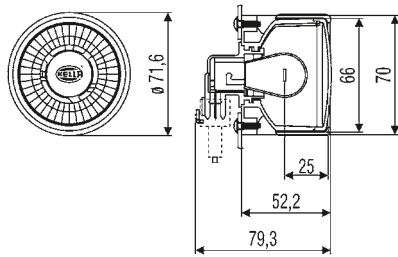


LED tail stop light and direction indicator Ø 66 mm

With clear lens, 12 LEDs and AMP connector.

12 V, tail stop light	2SB 009 001-401
24 V, tail stop light	2SB 009 001-501
12 V, direction indicator, without pulse	2BA 009 001-411
24 V, direction indicator, without pulse	2BA 009 001-511
12 V, direction indicator, with pulse	2BA 009 001-431 ¹⁾
24 V, direction indicator, with pulse	2BA 009 001-531 ¹⁾

Type approval: Ⓔ 12390



Rear combination lamps Ø 66 mm

With mounted bulbs 12 V or 24 V, incl. design ring.

Red lens

24 V, direction indicator with ECE approval for double lights	2NE 009 001-127
12 V, stop light with ECE approval for double lights	2DA 009 001-057
12 V, tail stop light with ECE approval for double lights	2SB 009 001-067
12 V, rear fog lamp with SAE type approval for vehicles < 2,032 mm and > 2,031 mm wide	2NE 009 001-027
12 V, macro reflex reflector with SAE type approval for vehicles < 2,032 mm and > 2,031 mm wide	8RA 009 001-037

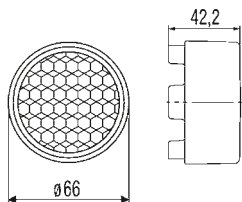
Grey lens

12 V, direction indicator with ECE approval for double lights	2BA 009 001-007
24 V, direction indicator with ECE approval for double lights	2BA 009 001-107
24 V, tail light with ECE approval for double lights	2SA 009 001-137
24 V, stop light with ECE approval for double lights	2DA 009 001-147
24 V, tail stop light with ECE approval for double lights	2SB 009 001-157
12 V, reverse light with SAE type approval for vehicles < 2,032 mm and > 2,031 mm wide	2ZR 009 001-017
24 V, reverse light with SAE type approval for vehicles < 2,032 mm and > 2,031 mm wide	2ZR 009 001-117

With Silvervision bulb

12 V, direction indicator with ECE approval for double lights	2BA 009 001-191
---------------------------------------------------------------	-----------------

Type approval: Ⓔ 3917, Ⓔ 6546, Ⓔ 7613, Ⓔ 23255, Ⓔ 3189 (reflex reflector)



Rear combination lamps design rings Ø 66 mm

Suitable for 66 mm light modules with Ø 71.6 mm (article number ...009 -001-... except LED versions), perfect high-gloss finish with one "click".

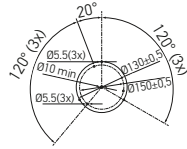
High-gloss chromium plated	9HB 161 122-012
Silver	9HB 161 122-007
Premium silver	9HB 164 168-002
Assembly stop ring (no image)	8HG 162 530-002

HELLA beacons with strong warning effect signal to other road users: Please take into consideration – work is being carried out around the vehicle.

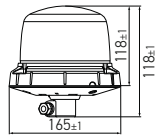
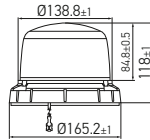
They enable maximum own- and third-party safety by means of an intensive warning effect. This safety is achieved by the optimum light bundling and distribution, the resulting high range as well as the very high light intensity.

You can rely 100% on our beacons: HELLA beacons are characterised through outstanding quality in terms of processing and stability – the long service life proves this!

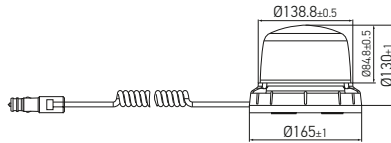
This LED product has the following features:



Fixed attachment



Flexible pipe-socket mounting



Magnetic attachment

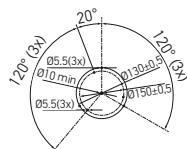
RotaLED Compact

The RotaLED Compact has been specially developed for use on forklift trucks. It has a multivolt system (10 – 30 V) and integrated reverse polarity protection. Thanks to the compact design (height approx. 12 cm), low weight, and impact-resistant dome, the beacon is well-suited for protection in internal transport or at construction or industrial plants.

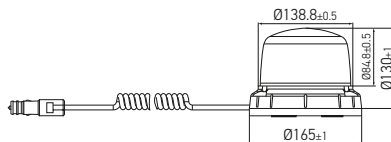
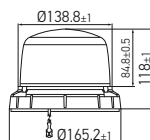
Fixed, yellow, flashing	2XD 013 979-001
Flexible pipe socket, yellow, flashing	2XD 013 979-011
Magnet, yellow, flashing	2XD 013 979-021

Type approval: ECE-R65, SAE J845 class 2

This LED product has the following features:



Fixed attachment



Magnetic attachment

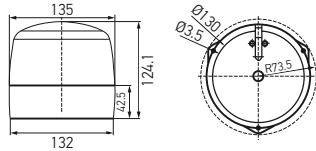
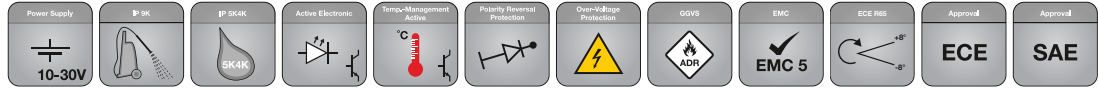
RotaLED Compact SAE

The RotaLED Compact SAE has been specially developed for use on forklift trucks. It has a multivolt system and integrated reverse polarity protection. Thanks to the compact design (height approx. 12 cm), low weight, and impact-resistant dome, the beacon is well-suited for protection in internal transport or at construction or industrial plants.

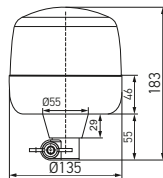
Fixed, yellow, flashing, 9-30 V	2XD 012 480-001
Fixed, red, flashing, 9-30 V	2XD 012 480-011
Fixed, white, flashing, 9-30 V	2XD 012 480-021*
Fixed, yellow, flashing, 10-110 V	2XD 012 480-201
Fixed, red, flashing, 10-110 V	2XD 012 480-211
Magnet, yellow, flashing, 9-30 V	2XD 012 480-101
Magnet, red, flashing, 9-30 V	2XD 012 480-111

* upon request

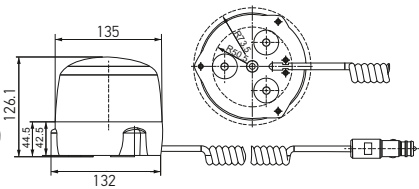
This LED product has the following features:



Fixed attachment



Pipe socket mounting



Magnetic attachment

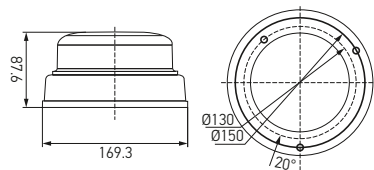
Rota LED

The RotaLED with rotating or flashing light function impresses with its high level of efficiency and its flat and compact design. With the shock-absorbing rubber foot, it boasts a high resilience against vibration and is thus perfectly suited for challenging applications.

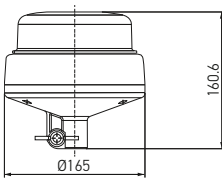
Fixed, rotating	2RL 010 979-001
Pipe socket, rotating	2RL 010 979-011
Magnet, rotating	2RL 010 979-021
Fixed, flashing	2XD 012 878-001
Pipe socket, flashing	2XD 012 878-011
Magnet, flashing	2XD 012 878-021

Type approval: ECE-R65, SAE 9845, class 2, 035517, ECE-R10

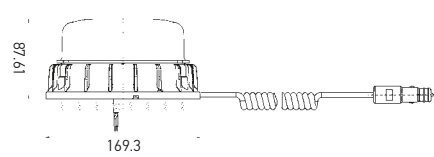
This LED product has the following features:



Fixed attachment



Pipe socket mounting



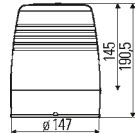
Magnetic attachment

K-LED 2.0

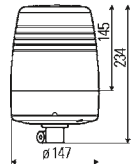
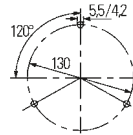
The first HELLA beacons where you can choose between rotating or flashing warning signals. Thanks to an integrated light sensor, switching between day and night mode happens automatically. This guarantees you the greatest warning effectiveness. Extremely flat design and impact-resistant dome. Radio signals are not disrupted by the K-LED 2.0.

Fixed, rotating, and flashing	2XD 011 557-101
Pipe socket, flashing	2XD 011 557-201
Magnet, flashing	2XD 011 557-301

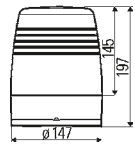
Type approval: ECE-R65, SAE 7845, class 1, 036816, ECE-R10: 036816



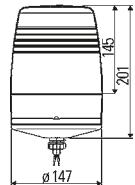
Fixed attachment



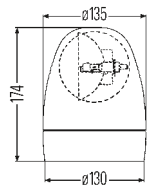
Flexible pipe-socket mounting



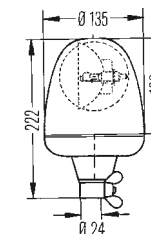
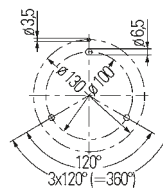
Magnetic attachment



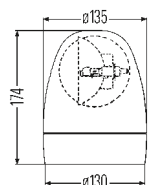
Tail/stop variant with central bolt



Fixed attachment



Pipe socket mounting



Magnetic attachment

KL Junior Plus

The Junior Plus beacon offers optimal light output, concentration, and distribution through its rotating unit comprising a reflector and bulb. It has a belt drive with maintenance-free bearings for a constant rotation frequency and optimal running smoothness. The beacon is characterised by its modern design with a robust dome that is easy to clean, and has integrated polarity reversal protection.

Fixed, 12 V	2RL 008 965-001
Fixed, 24 V	2RL 008 965-011
Fixed, 12 / 24 V	2RL 008 965-021
Flexible pipe-socket mounting, 12 V	2RL 008 967-001
Flexible pipe-socket mounting, 24 V	2RL 008 967-011
Flexible pipe-socket mounting, 12/24 V	2RL 008 967-021
Magnet, 12 V	2RL 008 966-001
Magnet, 12 / 24 V	2RL 008 966-021
Tail/stop variant with central bolt, 12 V	2RL 008 990-001
Tail/stop variant with central bolt, 24 V	2RL 008 990-011
Tail/stop variant with central bolt, 12/24 V	2RL 008 990-021














Rotaflex / Rotafix beacon

The Rotaflex / Rotafix beacon is a compact and resilient rotating beacon. It is characterised by excellent lighting output, an impact-proof light dome, and extremely high resilience to vibration.












12 V, fixed	2RL 007 337-001
24 V, fixed	2RL 007 337-011
12 V, Flex	2RL 006 846-001
24 V, Flex	2RL 006 846-011
12 V, Magnet	2RL 007 337-021
24 V, Magnet	2RL 007 337-031

Type approval: ECE-R65, SAE 7845, class 2, 032181

ACCESSORIES

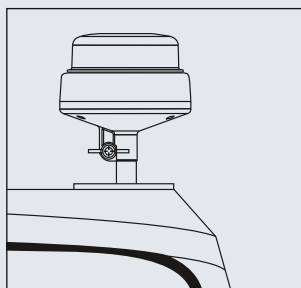
Product photo	Description	Part number	VPE
	Socket pipe to weld on, straight, 100 mm long, with rubber stopper and socket according to DIN 14620	1-pin 8HG 002 365-001 2-pin 8HG 006 294-101	1
	Extension tube with base for screwing on, overall height 126 mm, with rubber stopper and socket according to DIN 14620	1-pin 8HG 006 294-011 2-pin available on request	1
	Angled extension tube, with base for screwing onto the side, gap 90 mm, height 100 mm incl. rubber stopper, socket, 2 x hexagon screws M8 x 35, 2 x hexagon nuts M8, 2 x spring washers in accordance with DIN 14620	1-pin 8HG 006 294-021 2-pin available on request	1
	Angled socket pipe with base for screwing on from side, clearance 50 mm, height 100 mm incl. rubber stopper, socket, 2 x hexagon screws M8 x 35, 2 x hexagon nuts M8, 2 x spring washers according to DIN 14620	1-pin 8HG 006 294-111 2-pin available on request	1
	Rotatable socket pipe, height approx. 105 mm incl. rubber stopper, socket, 2 x hexagon screws M8 x 35, 2 x hexagon nuts M8, 2 x spring washers according to DIN 14620	1-pin 8HG 006 294-031 2-pin 8HG 006 294-141	1
	Socket pipe with screw attachment, height approx. 100 mm, with rubber stopper and socket according to DIN 14620	1-pin 8HG 006 294-051 2-pin 8HG 006 294-091	1
	Extension tube with 2 screw holes for mounting to the rear of the cab, with telescopic holder, overall height approx. 1,000 mm, option of displacement up to 700 mm, with rubber stopper and socket in accordance with DIN 14620	1-pin 8HG 006 294-041 2-pin available on request	1
	Socket pipe to weld on, straight, height 100 mm. Compatible with 8HG 002 365-001 / 8HG 006 294-101	8HG 096 531-007	2
	Socket pipe, straight, black with M8 thread, approx. 220 mm long. Compatible with 8HG 990 368-001 / -007	8HG 331 470-007	2
	Socket pipe, straight with base, to screwing, total height 126 mm. Compatible with 8HG 006 294-011 / -121	8HG 096 531-107	2
	Angled extension tube, with base for screwing onto the side, gap 90 mm. Compatible with 8HG 006 294-021 / -221	8HG 096 531-117	2
	Angled socket pipe, with base for screwing on from side, clearance 50 mm. Compatible with 8HG 006 294-111 / -211	8HG 096 531-127	2
	Swiveling extension tube, height approx. 105 mm. Compatible with 8HG 06 294-031 / -141	8HG 096 531-137	2

ACCESSORIES

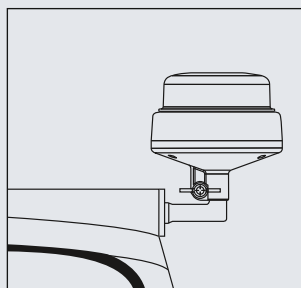
Product photo	Description	Part number	VPE
	2-pole socket with cap, with 2 blade couplings 6.3 mm	9JB 004 777-001* 9JB 004 777-002*	5 1
	2-pole round socket with ground contact, with 2 blade couplings 6.3 mm	8JB 862 757-001* 8JB 862 757-007*	1 24
	2-pole 6-edge SW20 socket with ground contact, with 2 blade couplings 6.3 mm	8JB 862 757-021* 8JB 862 757-027*	1 24
	2-pole socket with cap, with 300 mm cable 2.5 mm ² and 2 blade couplings 6.3 mm	8JB 001 946-101*	1
	2-pole aluminum alloy socket with cap and 1 screw connection ground on housing	8JB 001 946-021*	10
	2-pin socket with cover and 2 blade terminal connections 6.3 mm	8JB 004 123-031*	1
	1-pin round socket with fillister head screw M4 x 8	8JB 850 434-011*	10
	1-pin socket with cap	8JB 001 946-011*	10
	12 V, test equipment to monitor the function of rotating beacons and flashing beacons, indicates the failure of a beacon	5KG 011 630-101	1
	24 V, test equipment to monitor the function of rotating beacons and flashing beacons, indicates the failure of a beacon	5KG 011 630-111	1
	Rubber stopper /cap according to DIN 14620	9GH 096 532-001 9GH 096 532-007	10 200

* Sockets comply with DIN ISO 4165; installation opening: Ø 18.5 mm, control panel thickness max. 7 mm.

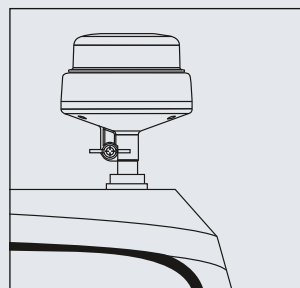
Installation examples



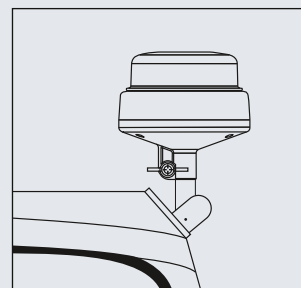
Bracket to screw on



Angle bracket



Bracket with thread



Variable bracket



Additional indicators and side marker lamps contribute daily to road safety.

As it is only these markings that make the entire vehicle easy to see – even in the dark.

HELLA offers ideal versions of both products with LED technology.

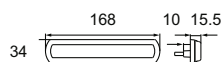
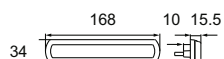
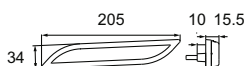
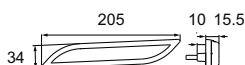
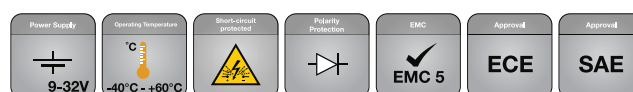
Durability, high luminosity and quick installation – these features are characteristic of HELLA products.

SHAPELINE PRODUCT OVERVIEW

The modular HELLA Shapeline product range provides a variety of different light functions that can be combined with each other individually. Here, all lamps are available in two different designs: The classic straight-line Shapeline Tech design and the dynamic curved Shapeline Style design.

Tech or Style: The HELLA Shapeline series provides design freedom for nearly any application and vehicle, and achieves a consistent light signature for your vehicle at the same time.

These LED products have the following features:



Shapeline side marker lights

Side marker lights, Style Design

Side marker lights, yellow, left **2PS 013 305-XXX***

Side marker lights, yellow, right **2PS 013 306-XXX***

Side marker lights, red, left **2PS 013 307-XXX***

Side marker lights, Tech Design

Side marker lamp with reflex reflector, yellow, horizontal **2PS 013 300-XXX***

Side marker lamp with reflex reflector, yellow, vertical **2PS 013 301-XXX***

Side marker lamp with reflex reflector, yellow, horizontal **2PS 013 302-XXX***

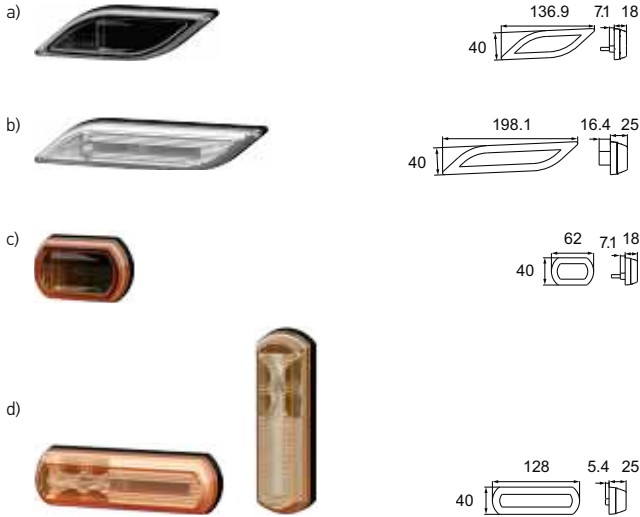
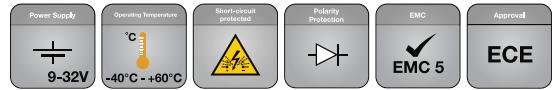
Side marker lamp with reflex reflector, red, horizontal **2PS 013 303-XXX***

Side marker lamp with reflex reflector, red, vertical **2PS 013 304-XXX***

* Please see our Shapeline brochure for a detailed overview of all part numbers and versions. Alternatively, with the HELLA Shapeline online configuration tool you are just a few clicks away from your own fully customised vehicle light design for the front, sides, and rear end: www.hella.com/shapeline.



These LED products have the following features:



Shapeline direction indicators

Direction indicators, Style Design

a) Direction indicator, side, cat. 5	2BM 013 338-XXX*
b) Direction indicator, side, cat. 6	2BM 013 339-XXX*

Direction indicators, Tech Design

c) Direction indicator, side, cat. 5	2BM 013 336-XXX*
d) Direction indicator, side, cat. 6	2BM 013 337-XXX*

These LED products have the following features:



Shapeline reflex reflector

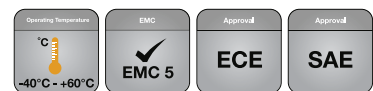
Reflex reflector, Style Design

a) Reflex reflector	2RA 013 347-XXX*
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Reflex reflector, Tech Design

b) Reflex reflector	8RA 013 403-XXX*
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This LED product has the following features:



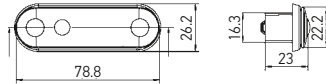
Shapeline clearance lamps

Clearance lamp, Tech Design

Clearance lamp	2SX 013 327-XXX*
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* Please see our Shapeline brochure for a detailed overview of all part numbers and versions. Alternatively, with the HELLA Shapeline online configuration tool you are just a few clicks away from your own fully customised vehicle light design for the front, sides, and rear end: www.hella.com/shapeline.

This LED product has the following features:



LED side marker light

1 LED, 12 / 24 V, power consumption 0.5 W / 12 V and 1.0 W / 24 V, operating temperature -40°C to +50°C, two-core sheathed cable, 500 mm, cable end open, with 2 screws Ø 4 mm.

Yellow cover lens

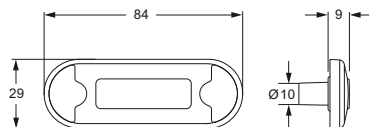
2PS 959 788-002/7

Clear cover lens

2PS 959 788-102/7

Type approval: E 0004

This LED product has the following features:



DuraLED side marker light

For horizontal mounting, 2 LEDs, power consumption 0.5 W, lens made from impact-resistant Grilamid, extremely durable, slim design - 9 mm profile, mounting variant, high vibration resistance, reverse polarity protection

500 mm cable, black end caps

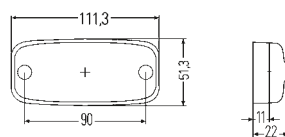
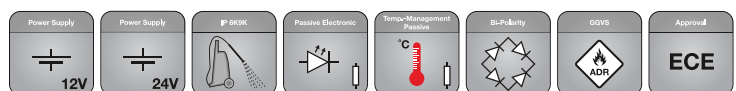
2PS 980 868-201

2,500 mm cable, black end caps

2PS 980 868-211

Type approval: E 0007

This LED product has the following features:



LED side marker light

2 LEDs, 12 / 24 V, power consumption 0.6 W / 12 V and 1.2 W / 24 V, operating temperature -40°C to +50°C.

12 V, 500 mm cable, open end

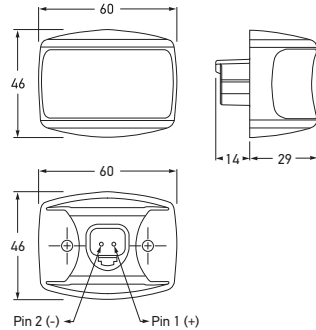
2PS 345 600-001

24 V, 500 mm cable, open end

2PS 345 600-011

Type approval: E 5881

This LED product has the following features:



DuraLED side marker light

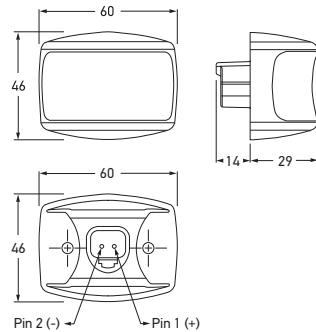
2 LEDs, power consumption < 1 W, operating temperature -40°C to +60°C, reverse polarity protection, assembly with 2 screws Ø 4 mm, DEUTSCH connector.

12 / 24 V, Kat. SM1

2PS 980 990-301/7

Type approval: 5892

This LED product has the following features:



DuraLED marker light (additional side direction indicator)

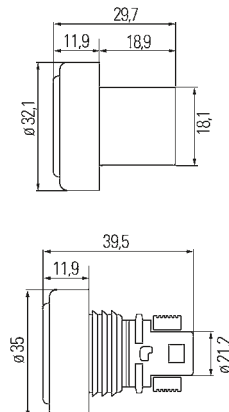
2 LEDs, power consumption <1 W, operating temperature -40°C to +60°C, reverse polarity protection, with 2 screws Ø 4 mm and DEUTSCH connector.

12 / 24 V, Kat. 5

2BM 980 990-121/7

Type approval: 0067

This LED product has the following features:



LED auxiliary indicator, cat. 5

12 V, power consumption 0.7 W, operating temperature -40°C to +60°C, screwed, 2-pin EasyConn, rubber housing, AMP-SUPERSEAL, rubber housing, 6.3 mm receptacles, and plastic housing.

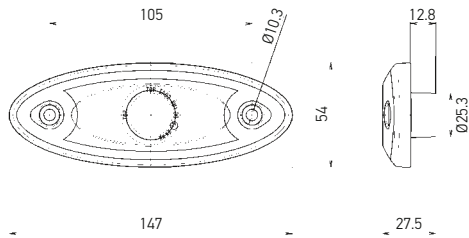
Screwed, 2-pin EasyConn With rubber housing **2BM 340 825-201/7**

AMP-SUPERSEAL (AMP 282080-1) With rubber housing **2BM 340 825-211/7**

6.3 mm receptacles With plastic housing **2BM 340 825-301/7**

AMP-SUPERSEAL (AMP 282080-1) With plastic housing **2BM 340 825-311/7**

Type approval: 01 0066



with 6.3 mm contact

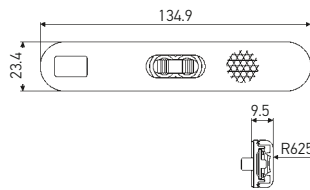
This LED product has the following features:

**LED side marker light**

For surface mounting, modern night-time design and high level of safety thanks to maximum illumination area, 12 V, additional versions available on request.

6.3 mm contact pin, white frame	2PS 344 690-007
6.3 mm contact pin, grey frame	2PS 344 690-027
6.3 mm contact pin, black frame	2PS 344 690-067
AMP-SUPERSEAL, white frame	2PS 344 690-607
AMP-SUPERSEAL, black frame	2PS 344 690-617

Type approval: 5853



This LED product has the following features:

**LED side marker light**

For horizontal surface mounting, with 250 mm cable, self-adhesive.

12 V, horizontal	2PS 009 226-021/7
12 V, vertical	2PS 009 226-077

For horizontal surface mounting, with 6.3 mm contacts and counterplug grommet, self-adhesive.

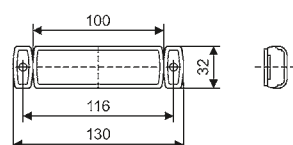
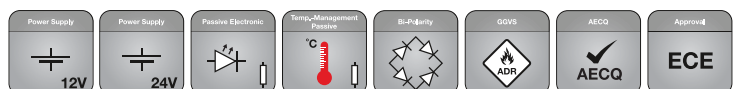
12 V, horizontal	2PS 009 226-067
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2-pin AMP connector, self-adhesive.

24 V, horizontal	2PS 009 226-017
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Type approval: 10236

This LED product has the following features:

**LED side marker light with reflex reflector**

With 1 yellow LED, for vertical assembly, yellow lens, black housing, ADR-tested.

12 V, 1,500 mm cable	2PS 008 645-981
24 V, 1,500 mm cable	2PS 008 645-991

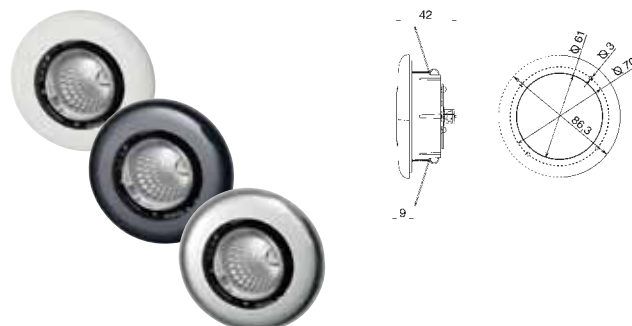
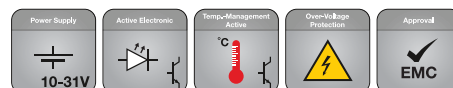
Type approval: 1395



HELLA offers a comprehensive range of interior lighting for various vehicle applications and vehicle types.

The product range includes ambient lighting in the form of light guides and LED modules, continuous lighting systems/modules for ceiling systems, service sets (control units), and step lighting.

These LED products have the following features:



Standard LED spotlights, fixed

Number of Power LEDs	1 white
Illumination angle	40° or 20°
Illuminance in 1 m	156 lx (20°), 65 lx (40°)
IP protection class	3 x
Power consumption	2 W (0.16 A at 12 V)
Lens	Clear
Mounting	Choice between screw or spring-assisted mounting
Current consumption of spotlight at 12 V/2.5 W	Approx. 0.20 A

Flush-mounting, fixed, wide illumination (40°)

Finisher colour ¹⁾	
White	2JA 344 040-701
Black	2JA 344 040-711
Silver	2JA 344 040-721

Flush-mounting, fixed, spot-type illumination (20°)

Finisher colour ¹⁾	
Silver	2JA 344 040-761

Accessories

Round finisher with angled edges	
Chrome	9AB 344 057-061
Gold	9AB 344 057-071

Round finisher with rounded edges

Chrome	9AB 344 045-061
Gold	9AB 344 045-071
Stainless metal frame, polished	9AB 959 505-501
Stainless metal frame, satined	9AB 959 505-561

Square finisher with angled edges

Chrome	9AB 344 058-061
Gold	9AB 344 058-071

¹⁾ Further finisher colours (e.g. real-wood look) or ambient Celis® light guide ring (e.g. blue, red) on request.

Standard LED spotlights, adjustable

Number of Power LEDs	1 white
Illumination angle	40° or 20°
Illuminance in 1 m	156 lx (20°), 65 lx (40°)
IP protection class	3 x
Power consumption	2 W (0.16 A at 12 V)
Lens	Clear
Mounting	Choice between screw or spring-assisted mounting
Current consumption of spotlight at 12 V/2.5 W	Approx. 0.20 A

Flush-mounting, adjustable, wide illumination (40°)

Finisher colour ¹⁾	
White	2JA 343 790-301
Black	2JA 343 790-311
Silver	2JA 343 790-341

Flush-mounting, adjustable, spot-type illumination (20°)

Finisher colour ¹⁾	
Silver	2JA 343 790-441

¹⁾ also with white, ambient Celis® light guide ring, current consumption of the Celis® light guide ring at 12 V / 0.5 W = approx. 0.04 A.

Flush-mounting, adjustable, wide illumination (40°)

Finisher colour ¹⁾	
White	2JA 343 790-701
Black	2JA 343 790-711
Silver	2JA 343 790-741

Flush-mounting, adjustable, spot-type illumination (20°)

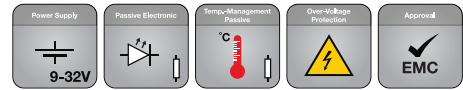
Finisher colour ¹⁾	
Black	2JA 343 790-611

¹⁾ Further finisher colours (e.g. real-wood look) or ambient Celis® light guide ring (e.g. blue, red) on request.

Accessories

Finisher chrome	9AB 343 792-061
Finisher gold	9AB 343 792-071

This LED product has the following features:



LED spotlights round, flat flush-mounting/surface-mounting

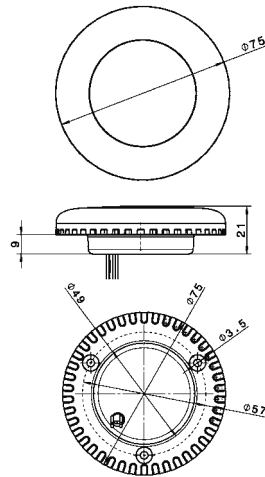
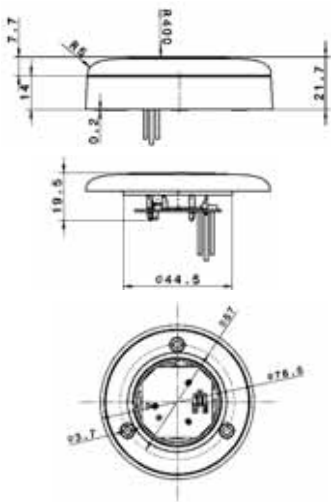
Illumination angle	35°
Illuminance at 1 m	45 lx (Standard), 105 lx (High-Power)
IP protection class	20
Power consumption	Standard 1.5 W (0.12 A at 12 V) High power 2.6 W (0.21 A at 12 V)
Dimensions	Recessed mounting version only 14 mm Surface mounting version only 22 mm
Voltage	5 VDC (connection possible only with control unit)

Individual packaging

Comprising 1 LED spotlight, 1 coloured light frame, 1 coloured installation frame, 1 sealing ring for installation

Standard LED spotlight

High-Power LED-Spot



Installation, fixed Finisher colour ²⁾	Standard LED spotlight 1.5 W	High-Power LED spotlight 2.6 W (double light power with cooling element)
---------------------------------------------------	------------------------------	--------------------------------------------------------------------------

Without Celis®

White	2JA 344 199-001	2JA 344 599-001
Black		2JA 344 599-011
Silver		2JA 344 599-021

With Celis® warm-white ambient

White		2JA 344 599-101
Black		2JA 344 599-111
Silver	2JA 344 199-121	2JA 344 599-121

With Celis® blue ambient

White	2JA 344 199-201	2JA 344 599-201
Black	2JA 344 199-211	2JA 344 599-211
Silver	2JA 344 199-221	2JA 344 599-221

With Celis® red ambient

White		2JA 344 599-301
Black	2JA 344 199-311	2JA 344 599-311
Silver		2JA 344 599-321

With Celis® orange ambient

White	2JA 344 199-351	2JA 344 599-351
Black		2JA 344 599-361
Silver	2JA 344 199-371	2JA 344 599-371

Accessories

Installation frame, the overall height with frame is 22 mm

Chrome	9AB 344 192-061
Gold	9AB 344 192-071

A control unit is required in order to use more than one spotlight.

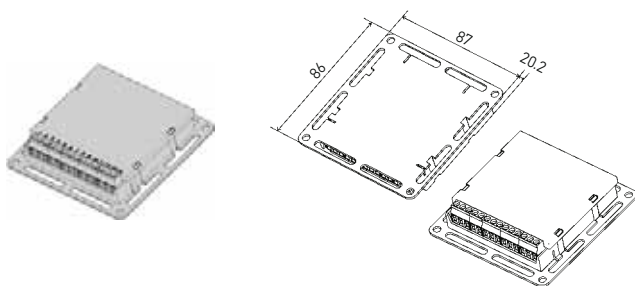
Number of circuits	Max. 8 LED spotlights in 1 or 2 dimming circuits
IP protection class	30
Power consumption	1 – 16 W
Voltage	Multivolt (9 – 32 VDC)

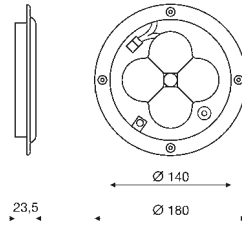
For 4 Standard or High-Power spotlights please use ...	5XA 344 150-001
---------------------------------------------------------------	------------------------

For 8 Standard or 5 high power spotlights please use ...	5XA 344 150-011
-----------------------------------------------------------------	------------------------

¹⁾ Connection possible only with control unit (5XA 344 150-001/-011).

²⁾ Further finisher colours (e.g. real-wood look) available on request.





This LED product has the following features:



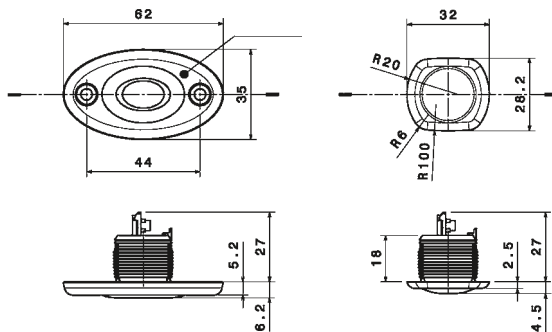
CargoLED

Number of LEDs	4 white Power LEDs
Connection	Electrical, via a 310 mm long cable
Illumination angle	44° (wide illumination at close range)
Illuminance in 1 m	180 lx
IP protection class	6K9K
Power consumption	6 W (0.5 A at 12 V)
Lens	Clear
Mounting	Flush-mounting (aluminium installation frame)
Temperature range	-40 °C to +60 °C

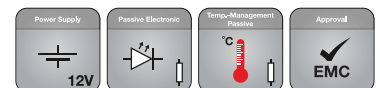
Cold white	2JB 343 227-001
Warm white	2JB 343 227-041

Accessories

Installation frame, grey	9XD 344 118-101
--------------------------	------------------------



This LED product has the following features:



Ambient LED spotlight

Number of LEDs	1 LED
Illuminance in 1 m	5 lx
IP protection class	20
Power consumption	0.3 W (0.02 A at 12 V)
Lens	Clear
Scope of delivery	3 frames (white, grey and black)
Mounting	Surface-mounting via attachment element

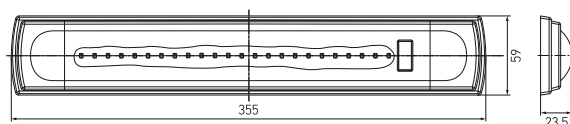
LED red	2JA 344 170-001
LED blue	2JA 344 170-011
LED white	2JA 344 170-021
LED yellow	2JA 344 170-031

Variant

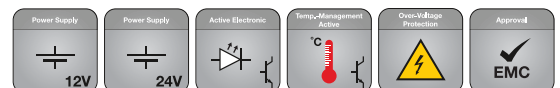
White LED, with a silver instead of a grey frame	2JA 344 170-201
--------------------------------------------------	------------------------



For illustrative purposes only



This LED product has the following features:

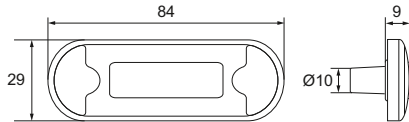
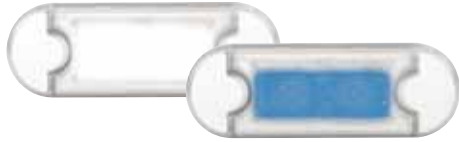
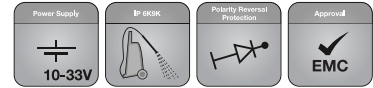


LED surface-mounted light with integrated switch

Number of LEDs	24 LEDs
Illuminance in 1 m	Approx. 200 lx
Length	355 mm
Light colour	4,000 K (neutral white)
Nominal output	4.8 W
Current consumption	approx. 0.40 A at 12 V approx. 0.20 A at 24 V

12 V	2JA 007 373-301
24 V	2JA 007 373-311

This LED product has the following features:

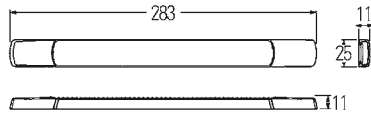


LED step light

Number of LEDs	2 LEDs
Connection	Electrical, using a cable 500 mm long
Connecting bracket	30°
Illuminance in 1 m	15 lx
Feature	With polarity reversal protection
Power consumption	0.5 W (0.04 A at 12 V)
IP protection class	6K9K
Lens	Clear
Scope of delivery	Seal, fixing screws and screw caps
Mounting	Installation

White LEDs	2XT 980 855-117
Blue LEDs	2XT 980 855-417

This LED product has the following features:

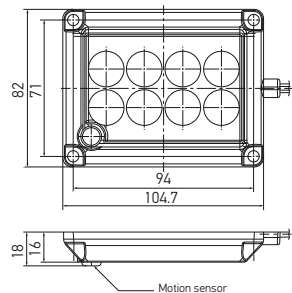
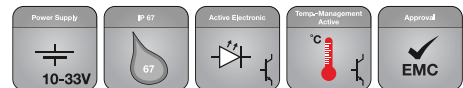


Slim LED surface-mounted lamp

Number of LEDs	10 LEDs
Connection	2,500 mm cable
Operating temperature	-40 °C to +60 °C
IP protection class	6K7, 6K9K
Mounting	Horizontal or vertical
Nominal output	3 W
Voltage	12 V and 24 V

12 V, white	2JA 980 879-011
24 V, white	2JA 980 879-111
12 V, warm white	2JA 980 879-201
24 V, warm white	2JA 980 879-301

This LED product has the following features:

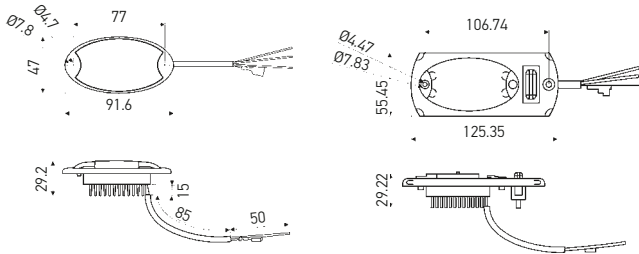
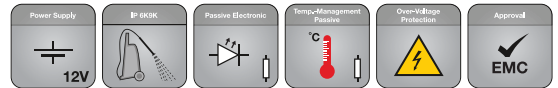


LED ceiling light

Number of LEDs	8 LEDs
Illuminance in 1 m	Approx. 240 lx
Dimensions of light	105 x 82 x 16 mm (L x B x H)
IP protection class	67
Light color	5,700 K (neutral white)
Mounting	Approx. 65°
Illumination angle	Approx. 3.3 W
Nominal output	Approx. 0.28 A at 12 V
Current consumption	Approx. 0.14 A at 24 V

Without motion detector	2JA 012 557-011
With motion detector	2JA 012 557-001

This LED product has the following features:

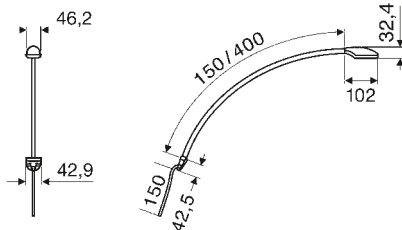


MINI OvalLED

Number of LEDs	4 white LEDs, 1 ambient LED
Illumination angle	50°
Illumination	Side driver or instrument range
Illuminance at 1 m	Standard 14.5 lx, Power 54 lx
Function	Ambient lighting can be switched on
IP protection class	6K9K (without frame/switch), 40 (with frame/switch)
Power consumption	Standard 1.7 W (0.14 A at 12 V) Power 3.6 W (0.30 A at 12 V)
Lens	Brilliant and clear
Mounting	Installation
Voltage	12 V or 24 V
Current consumption	12 V/3.6 W = approx. 0.30 A
Temperature range	-40 °C to +60 °C

LED equipment	Without frame and switch	With frame and switch
4 white power LEDs, red	2JA 343 570-011	2JA 343 570-051
4 white power LEDs, blue	2JA 343 570-117	2JA 343 570-157
4 white standard LEDs, red	2JA 343 570-031	-

This LED product has the following features:



LED reading light, flexibly adjustable arm

Number of LEDs	1 white Power LED
Connection	Electrical, using a cable 150 mm long
Illumination	Optimal for map-reading
Illumination angle	38°
Illuminance at 0.7 m	110 lx
IP protection class	53
Power consumption	2.5 W (0.20 A at 12 V)
Lens	Patterned
Mounting	Mounting

Trim colour white¹⁾

150 mm	2JA 343 720-011
400 mm	2JA 343 720-111
With plug for cigarette lighter (150 mm)	2JA 343 720-071

Finisher colour black¹⁾

150 mm	2JA 343 720-021
400 mm	2JA 343 720-121
With plug for cigarette lighter (150 mm)	2JA 343 720-081

Finisher colour silver¹⁾

150 mm	2JA 343 720-291
400 mm	2JA 343 720-191
With plug for cigarette lighter (150 mm)	2JA 343 720-091

¹⁾ further finisher colours available on request.



Electronic components – benefit from our unique experience and innovative power.

HELLA is one of the first ports of call for the international supplier industry not just in lighting technology but also in electronic components.

One thing all our products have in common is that their quality and output are carefully optimised to meet the special requirements of our customers.

The complete range of electronics can be found at www.hella.com/soe-electronics

PRODUCT DIVISION

Energy management



Careful use of energy by appropriately influencing of the consumer:

These electronic systems make it possible to monitor and plan the energy budget and maintain the power supply.



Intelligent battery sensors



Voltage stabilisers

Drive train



Increasing the safety and efficiency of the overall system and preventing failures:

These electronic systems make it possible to precisely measure and record values in the engine compartment and drive train.



Oil level switches



Oil pressure sensors



Oil level sensors



Accelerator pedal sensors



Accelerator pedal sensors

Components



Provide added convenience with compact solutions in a variety of areas:

These electronic systems are generally invisible little helpers for the various automatic processes within the vehicle.



Turning angle sensors



Air quality sensors



Remote controls



Rain/light sensors



Actuators



Temperature sensors

Lighting electronics



Provide added convenience with compact solutions in a variety of areas:

These electronic systems are generally invisible little helpers for the various automatic processes within the vehicle.



LED flasher unit towing vehicle



LED lamp control unit



Control unit for flashing side marker lights



Current monitoring control unit



Simulation device for cold checking



PRODUCT FEATURES

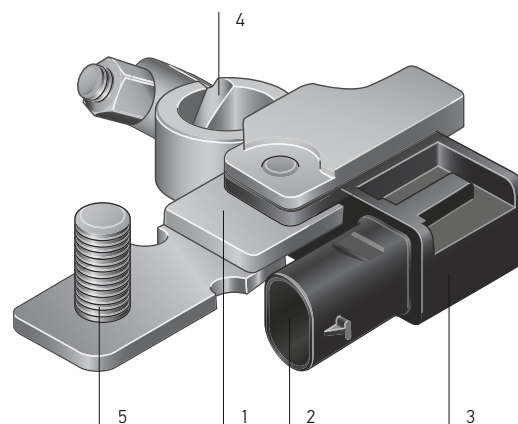
- High-accuracy measurement of battery voltage, current and temperature parameters
- Determining the battery condition parameters State of Charge (SOC), State of Health (SOH) and State of Function (SOF)
- Simple electrical and mechanical integration

APPLICATION

The intelligent battery sensor (IBS) from HELLA is the key element of vehicle energy management.

The IBS reliably and accurately measures the battery voltage, current and temperature parameters. Information on the state of charge (SOC), state of health (SOH) and state of function (SOF) of the battery is calculated algorithmically using these measurements. The IBS is designed to be used in starter, gel and AGM batteries to monitor in-vehicle starter or consumer batteries. The IBS can be directly integrated into the vehicle's electrical system with the standardised LIN protocol.

Intelligent battery sensors



DESIGN AND FUNCTION

The IBS is attached directly to the negative terminal of the battery via the pole terminal **(4)**.

In addition to the terminal, the mechanical portion of the battery sensor consists of shunt **(1)** and ground bolt **(5)** components. The shunt is attached to the vehicle's load path and is used as a measuring resistor to measure the current indirectly. On the ground bolt **(5)**, the existing ground cable can be conveniently attached, for example, to the optionally available battery pole adapter.

The electronics are located in a molded housing **(3)** with plug connector **(2)**, functioning as the interface to the energy management system. The communication interface to the higher-level control unit is the LIN protocol. The supply voltage, used simultaneously as the reference voltage for voltage measurement, is provided by the connection to the positive pole of the battery.

The ASIC is the main electronics component used to record and process measured values. Measured value acquisition in the ASIC, as a precision sensor, is the core function of the intelligent battery sensor and is used to record the physical parameters of current, voltage and temperature.

BATTERY STATUS ALGORITHMS:

The intelligent battery sensor calculates and monitors the following battery conditions

State of charge: The state of charge (SOC) describes the current charge status of the battery.

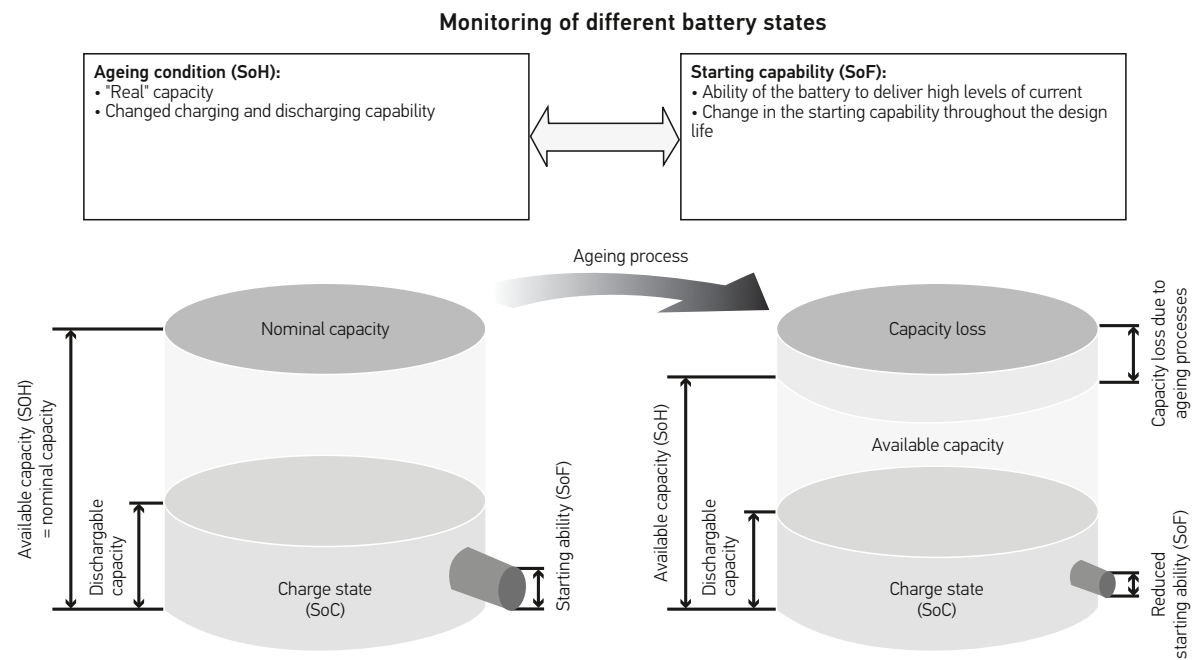
The SOC is defined as: $SOC [\%] = \text{dischargeable capacity} / \text{nominal capacity}$

State of health: The state of health (SOH) indicates the ageing status of the battery.

The state of health (SOH) is defined as: $SOH [\%] = \text{available capacity} / \text{rated capacity}$

The available capacity of the battery typically decreases as the battery ages and through lengthy use.

State of function: The state of function (SOF) describes the future cranking health of the engine on the basis of the currently measured current and the voltage,

**VARIANT OVERVIEW**

There are four variants of the intelligent battery sensor available. Sensor 1 is the basic version. Sensor 2 is used to monitor a second battery in the same communication network. The third version is used for two 12 V batteries connected in series (24 V vehicle electrical system). The fourth version is envisaged for vehicles with high starting currents (e.g. agricultural and construction machines) as well as with higher logic earth cable cross-sections (> 70 mm²).

Operating voltage	Type	Mating connector	Part number
6 – 16.5 V	Sensor 1	Hirschmann 872-858-565	6PK 010 842-001
6 – 16.5 V	Sensor 2	Hirschmann 872-858-565	6PK 010 842-011
7.5 – 32 V	–	Hirschmann 872-858-546	6PK 011 700-001
6 – 16.5 V	For motorhomes	Hirschmann 872-857-561	6PK 013 824-001
6 – 16.5 V	For agricultural and construction machinery	Hirschmann 872-858-546	on request



Upright/pendant accelerator pedals

PRODUCT FEATURES

- Contact free measuring principle
- Slim and sturdy design
- Simple mechanical connection
- Redundant output signal
- High degree of measuring accuracy, which means no learning process is necessary in the vehicle
- High interference immunity against electrical and magnetic fields

DESIGN AND FUNCTION

Housing and operating lever or pedal plate are made from fully reusable, glass-fibre reinforced plastic. The sensor is inserted into a slot of the device, fully waterproof, and does not protrude from the package space. The actuation force is generated by two springs, which both return separately. The electric output signal is extracted using the CIPOS® measuring principle. For this, a cursor plate is guided from the pedal arm to the measuring board via sensor conducting paths. There, two galvanically separated sensors each generate an output signal. Different output signals can be generated depending on the measuring board used. Furthermore, it is possible to program individual characteristic curves upon request.

APPLICATION

The accelerator pedals are suitable for driver's cabs in agricultural and construction machinery. Thanks to the wear-free measuring principle of HELLA's in-house developed CIPOS® sensors (see description of the design and function of the turning angle sensors) and their extremely low level of mechanical wear, this version is particularly suitable for contact-type accelerator pedals that effect frequent small movements.

VARIANT OVERVIEW

Description	Pedal material	Part number
Floor-mounted accelerator pedal	Plastic	6PV 312 010-107
Suspended accelerator pedal	Plastic	6PV 009 591-011



Rain/light sensors

Recording environmental properties

PRODUCT FEATURES

- Fourth generation of the long-established rain sensors by HELLA
- Up to five functions in one product: Rain, light, solar, and humidity measurement as well as adjustment of the light intensity on the head-up display
- Optimised design – especially compact package space

APPLICATION

The rain/light sensor can be used in its full functional range (five functions: rain sensor, light sensor, solar sensor, humidity measurement and head-up display) only for passenger car applications. This sensor can only be used to a limited extent for vehicles with special windshields (thickness, angle, transmission).

The optics of the second sensor are specially designed for vehicles with steep windshields and combines the rain and light recognition functions (environment and tunnel recognition).

VARIANT OVERVIEW

The sensors must be specially applied for each vehicle. For that reason all part numbers are customer-specific provided.

Areas of use	Permissible glass thickness	Permissible glass tilt	Part number
Car	4–6 mm	22°–32°	on request
Vehicles with special windshields	6–9 mm	80°–90°	on request



PRODUCT FEATURES

Electronic radio transmitter key:

- Unlocking of cabin doors/flaps
- Control of lamps/worklights
- Activating/deactivating an electronic immobiliser via a transponder
- Robust design

APPLICATION

The radio transmitter system was specially developed under hard operating conditions (agricultural, construction machines, commercial vehicles). The system enables the driver to conveniently unlock the cabin door. The remote control can be equipped with one or two buttons, depending on the customer's requirements. The rugged design has been specially developed for use with agricultural and construction machinery. An additional control unit with up to four output signals also makes it possible to control lights, e.g. worklights or beacons. The HELLA wireless remote system makes it easy to activate the flashers as well as opening and locking of compartments, e.g. the engine compartment and tool containers. The design can be customised on request, e.g. to incorporate customer-specific logos.

Radio transmitter systems

Switching on and off or opening and locking

DESIGN AND FUNCTION

With regard to the electrical function, the transmitter consists of the transmitter electronics and transponder units. The transponder responsible for the immobiliser function does not depend on the transmitter electronics and can be specified by the customer.

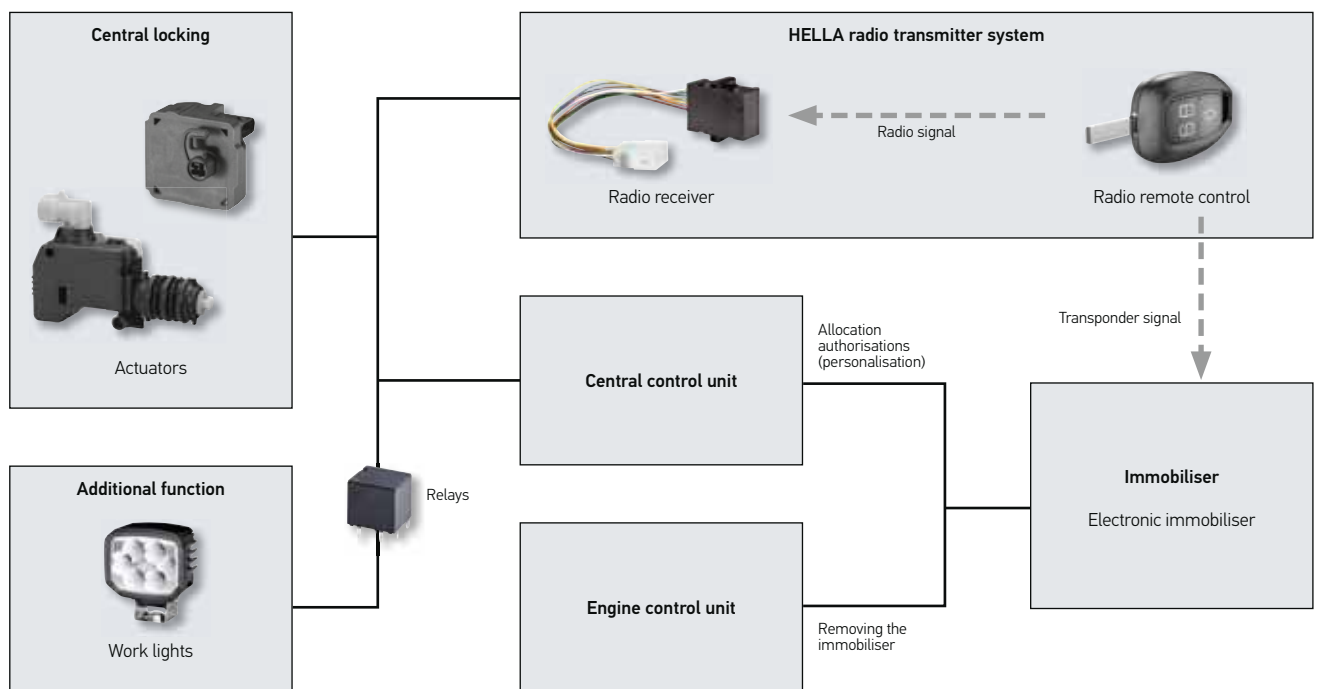
The transmitter is mounted to a double-sided populated PCB. In addition to the actual transmitter electronics, the printed circuit board contains the locking/unlocking button and depending on the variant a further button (additional function). The printed circuit board and the battery are electrically connected by the spring contact elements. By pressing a button, the radio remote control sends data packages provided with a roll code and an up-to-date 128 bit encryption. If the data are positively decoded by the receiving control unit of the radio remote control, this will activate the output signal of the control unit.

The radio control system can be used in every European country and also in North America (USA + Canada) and India without limitations. System radio approvals outside Europe can be carried out in consultation with HELLA.

The radio remote control is equipped with a holder for a mechanical key bit. The mechanical key bit is not included in the scope of delivery for the radio transmitter electronics. The key bit is usually mounted (by using a special mounting device) either at the customer's premises or at the manufacturer's.

Two radio transmitter keys are "taught-in" and assigned to the device during production of the radio receiver. Teaching additional radio transmitter keys in the field requires at least one functioning, taught-in key. Up to 7 radio transmitter keys can be taught in. If the maximum number of radio transmitter keys has already been taught in, the last key place is overwritten when teaching in another key.

FUNCTIONAL DIAGRAM



VARIANT OVERVIEW

There are two variants of the reception control unit available. The basic version and the extended variant. Customer-specific output signal characteristics are available on request. If a customer-specific logo is intended, a new part number will be generated for this purpose. Each unit variant includes two blind plugs made of hard plastic. This enables the radio transmitter to be operated even without a key bit.

Variants	Part number
2 radio transmitters and receiver basic version	on request
2 radio transmitters and receiver extended version	5FA 012 485-817

Other variants and configurations available upon request.



PRODUCT FEATURES

- Compact, space-saving design
- Electrical resetting or automatic resetting (without current)
- Easy to fix in place thanks to snap-fit mounting
- Spray water protected
- With or without micro-switch
- Explosion report for tank modules

Electromotive actuators

Electric locking / unlocking, space-saving, with or without micro-switch, Low Force

APPLICATION

As a result of the very space-saving design, this actuator is well suited to locking and unlocking applications in dry and humid areas (e.g. including via remote actuation) in which only minimal package space is available.

Examples include:

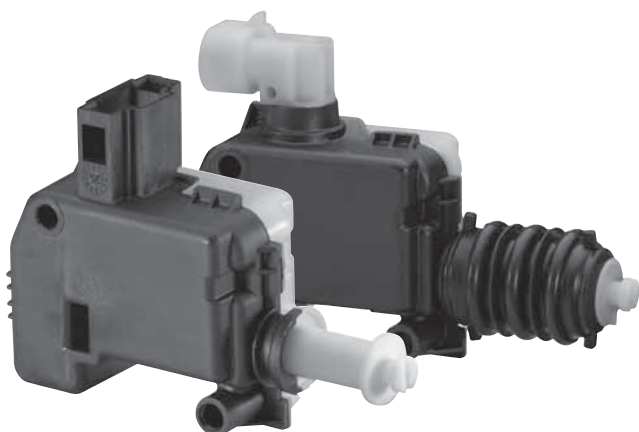
- Tank modules
- Service flaps
- Glove compartments
- Locking of the charging plug (e-mobility)

Function

When a voltage is applied, the motor integrated in the electromotive actuator moves the locking lever attached to the motor shaft.

VARIANT OVERVIEW

Function	Voltage	Actuating force	Manual adjustment	Protection level	Part number
Forward and reverse rotation electrical					
	12 V	-	Yes	IP 5K4	6NW 011 122-017
With micro-switch	12 V	-	Yes	IP 5K4	6NW 011 122-027
Electrical forward rotation and reverse rotation via return spring, with soft touch button					
	12 V	-	Yes	IP 5K4	6NW 011 122-047



Electromotive actuators

Electrical locking / unlocking and closing
(medium force)

PRODUCT FEATURES

- High actuating force
- High-accuracy, laser-welded housing
- Three versions
- Dust- and waterproof
- With or without manual adjustment
- Thermal overload protection through PTC (PolySwitch)
- Multifunctional
- Various connecting elements available

APPLICATION

The motor-driven actuator is used for electrical locking and unlocking or closing of locking and flap systems in vehicles and industrial applications.

Examples of applications in mechanisms include:

- Electrical locking and unlocking
- Electrical shutting
- Power opening and closing of all doors (locking systems), flaps, roof windows, seats, covers, hoods, glove boxes, etc.

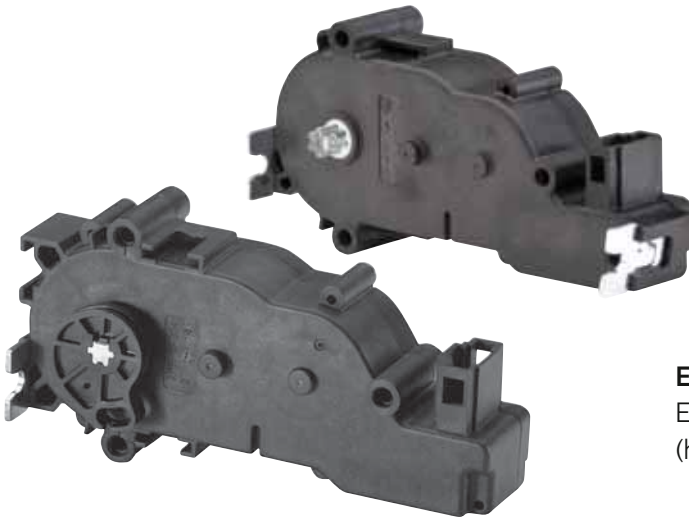
Accessories

The comprehensive range of accessories for electromotive actuators comprises numerous different joining elements. These allow the straightforward integration of the actuator in the application without additional development expenditure being necessary.

VARIANT OVERVIEW

Function	Voltage	Positioning force*	Manual adjustment	Protection level	Part number
Electrical retraction and extension					
	12 V	30 – 130 N	Yes	IP 5K0	6NW 009 203-401
	12 V	30 – 140 N	No	IP 5K0	6NW 009 203-411
	12 V	30 – 130 N	Yes	IP 5K4	6NW 009 203-421
	12 V	30 – 140 N	No	IP 5K4	6NW 009 203-431
	24 V	30 – 130 N	Yes	IP 5K4	6NW 009 203-441
	24 V	30 – 140 N	No	IP 5K4	6NW 009 203-451
	12 V	30 – 140 N	No	IP 5K4	6NW 009 203-557
Electrical retraction, extension with clockwork spring					
	12 V	30 – 170 N	No	IP 5K0	6NW 009 203-461
	12 V	30 – 170 N	No	IP 5K4	6NW 009 203-471
	24 V	30 – 170 N	Yes	IP 5K4	6NW 009 203-541
Electrical extension, retraction with clockwork spring					
	12 V	30 – 130 N	No	IP 5K0	6NW 009 203-491
	12 V	30 – 130 N	No	IP 5K4	6NW 009 203-501
	24 V	40 – 150 N	No	IP 5K4	6NW 009 203-521

* Dependent on the operating voltage and ambient temperature



PRODUCT FEATURES

- Very high positioning forces
- Sturdy and compact design
- Interference suppression class 3
- Universal interface for Bowden cable
- For universal use

Electromotive actuators

Electrical locking / unlocking and pull/push (high force)

APPLICATION

The actuator is particularly suitable for locking and pull / push applications for which high forces are required.

Examples include:

- Large locks
- Large flaps
- Seat release

Where a Bowden cable is used, the actuator can also work without being attached to the vehicle body, since it is fixed to the application through the Bowden cable sleeve and can be embedded in foam for noise insulation.

Function

This electromotive actuator is an actuator with rotary output driven by a DC motor. The actuator is operated by applying a voltage via a two-pin plug with contacts "+" and "ground". The return action is carried out by simply reversing the polarity or automatically via a spring. The direction of rotation and runtime are defined by the control unit. The actuator can be attached to three connecting points.

VARIANT OVERVIEW

Function	Voltage	Torque	Manual adjustment	Protection level	Part number
Retraction with spring, electrical extension	12 V	150 Ncm	No	IP 5K0	6NW 009 424-781
Electrical retraction and extension	12 V	300 Ncm	No	IP 5K0	6NW 009 424-791



Electromotive actuators

Electrical locking / unlocking and closing
Part number 6NW 011 303-011

PRODUCT FEATURES

- Flexible operating angle range
- Fast response time
- Precise position control
- CIPOS position sensor integrated directly at driven gear
- "True power on" function for angular ranges < 180°
- Controlled motion up to limit stop
- Self-blocking gearbox; low current consumption (< 25 mA) for holding the position
- Internal fault memory

APPLICATION

The URA can be used in a broad range of applications involving harsh environmental conditions, and can perform precise and reliable positioning. The insensitivity to magnetic fields and the high level of temperature stability, in particular, are the characteristic qualities of the CIPOS technology employed in the URA. Angles are measured inductively using a non-contact and hence wear-free method, thus guaranteeing a high measuring precision over the whole service life. An error memory records errors and the actuator is able to react differently to different errors.

APPLICATION EXAMPLES

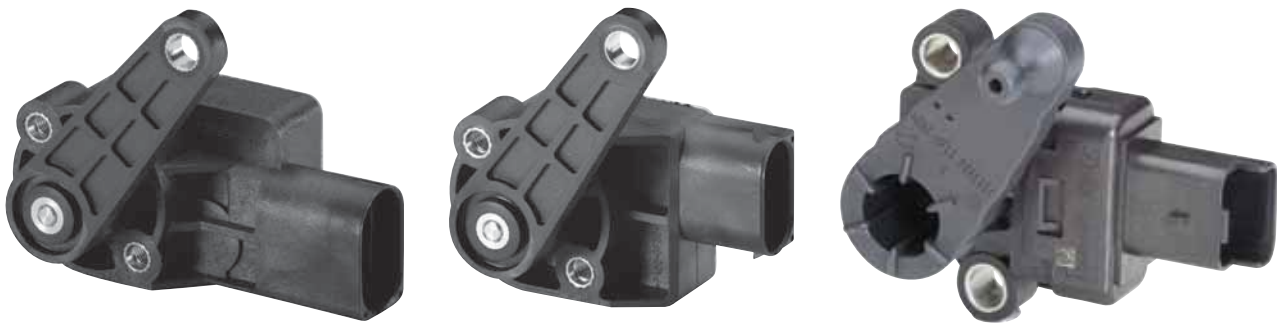
- Seed metering / singling
- Delivery air / exhaust air flaps

Function

The URA monitors the position of the output gear wheel and the integrated electronics continually calculate the position using an ASIC (Application Specific Integrated Circuit). The actuator offers the "true power on" function for angles less than 180°; i.e. it enables commissioning without calibration. In operation, the actuator carries out controlled movement to the programmable "soft stops". The self-locking transmission minimises current consumption (< 25 mA), which is required to maintain a defined position.

VARIANT OVERVIEW

Function	Voltage	Torque	Manual adjustment	Protection level	Part number
Power locking / unlocking and closing, power rotational movement to right and left, with position feedback via CIPOS technology	12 V	up to 300 Ncm	No	IP 6K9K oder IP 6K7 ¹ (¹ depends on the connector classification)	on request



Turning angle sensors

Single and double sensors

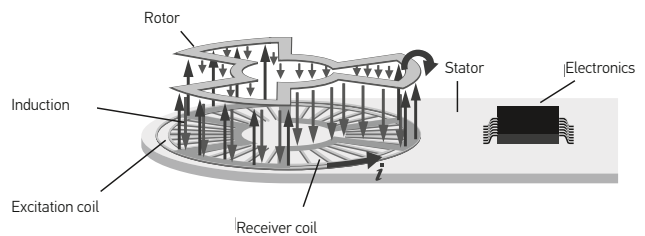
PRODUCT FEATURES

- Single or redundant sensors
- High precision due to internal 14 bit resolution
- High thermal stability and linearity
- High degree of insensitivity to magnetic fields
- Zero position can be individually programmed
- Various connecting elements available

APPLICATION

These CIPOS[®] angular position sensors (contactless inductive position sensors) can be used in many different applications to return accurate and reliable angular measurements even in tough environments. In particular, insensitivity to magnetic fields and a high degree of thermal stability are characteristic of the CIPOS[®] technology used in all these angular position sensors. Angles are measured inductively using a contact-free and hence wear-free method. This guarantees a high degree of precision throughout the entire life of the sensor. The redundant sensors (double sensors) are especially designed for failure detection, thus improving the reliability of the overall system.

Function

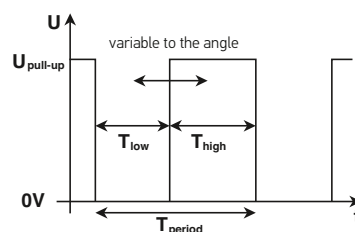


Inside the laser-welded polyamide housing (PA66), the rotation of the lever arm is transferred to the rotor and measured by induction. An ASIC (Application Specific Integrated Circuit) accurately computes the rotor position. Various mounting positions are possible thanks to the repeating characteristic curve of the output signal (which depends on the structure of the sensor that is used), which increases the flexibility of the sensor.

ANALOGUE OUTPUT

At a supply voltage of 5 V DC, the angle measured is rendered as the ratio of the output voltage (U_{out}) and operating voltage (U_s) (ratiometric to power supply). This signal is output by a high-side driver (HSD). At a supply voltage between 9 V and 32 V (multivoltage), the angle measured is rendered as a voltage between 0.5 V and 4.5 V.

PWM OUTPUT (DIGITAL)



When the PWM signal is used, the actual position of the angular position sensor is equivalent to the ratio of the low time of the PWM signal (T_{low}) and the period (T_{period}). The absolute duration of the high or low level is not indicative of the angle. The PWM signal is output by a low-side driver (LSD). You can of course also choose to evaluate the ratio between high time (T_{high}) and period (T_{period}). This will invert the course with reference to the analogue signal.

VARIANT OVERVIEW

Mechanical connection	Angle range	Supply voltage	Output signal	Zero position	Lever arm	Part number
Single sensors						
Socket	-30° to +30°	5 V	0.5–4.5 V ratiometric and PWM	0° / 120° / 240°	50 mm	6PM 008 161-241
Socket	-51° to +51°	5 V	0.5–4.5 V ratiometric and PWM	0° / 120° / 240°	50 mm	6PM 008 161-251
Socket	-54° to +54°	5 V	0.25–4.75 V ratiometric and PWM	0° / 120° / 240°	70 mm	6PM 008 161-121
Socket	-54° to +54°	5 V	0.25–4.75 V ratiometric and PWM	60° / 180° / 300°	70 mm	6PM 008 161-131
Socket	-54° to +54°	5 V	0.25–4.75 V ratiometric and PWM	30° / 150° / 270°	50 mm	6PM 008 161-141
Socket	-54° to +54°	5 V	0.25–4.75 V ratiometric and PWM	90° / 210° / 330°	50 mm	6PM 008 161-151
Basic sensors - Compact design						
Ball, top	-54° to +54°	5 V	0.5–4.5 V ratiometric	0° / 120° / 240°	39 mm	6PM 010 200-501
Ball, bottom	-54° to +54°	5 V	0.5–4.5 V ratiometric	0° / 120° / 240°	39 mm	6PM 010 200-511
Ball, bottom	-54° to +54°	5 V	0.5–4.5 V ratiometric	0° / 120° / 240°	51 mm	6PM 010 200-521
Ball, top	-54° to +54°	5 V	0.5–4.5 V ratiometric	0° / 120° / 240°	64 mm	6PM 010 200-531
Double sensors						
Socket	-30° to +30°	5 V or 9–32 V	0.5–4.5 V ratiometric/absolute	0° / 120° / 240°	50 mm	6PD 009 583-001
Socket	-54 to +54°	5 V or 9–32 V	0.5–4.5 V ratiometric/absolute	0° / 120° / 240°	50 mm	6PD 009 583-011
Socket	-54 to +54°	5 V	0.5–4.5 V ratiometric	0° / 120° / 240°	70 mm	6PD 009 580-017
Ball, top	-54 to +54°	5 V or 9–32 V	0.5–4.5 V ratiometric/absolute	0° / 120° / 240°	90 mm	6PD 009 584-017



As a worldwide partner to the automotive industry, HELLA offers systems expertise, experience with large-volume production, and process know-how to allow fast implementation of innovative concepts in efficient and reliable serial products.

This is why the electrics range from HELLA is so extensive: From A for "Acoustic signaling device" to W for "Washer pumps".

Through constant expansion and optimisation, we offer a wide range of relays and relay devices.



Rocker switch, 3100 series

- Waterproof module switch series
- Also suitable for outdoor applications!
- For electrical systems
- Protection class IP 68: Completely waterproof
- LED lighting of the lasered symbols through integrated LEDs
- Symbol illumination green, function display red (unless specified otherwise)

Configure your individual switches
www.hella.com/switch



Module switch series 4100

- Module switch series with self-cleaning switch
- Safe switching of small currents without contaminating the contacts
- Suitable for electric and electronic systems
- Protection class IP 54
- LED lighting of the symbols
- Symbol illumination green, function display red (unless specified otherwise)

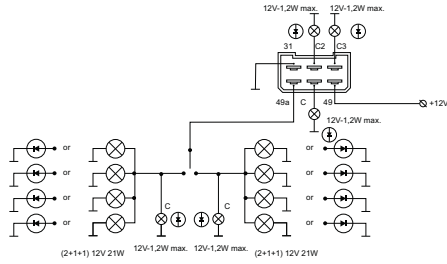
Configure your individual switches
www.hella.com/switch



Module switch series 4570 / 7832

- Proven for simple electrical systems
- For price-sensitive applications
- Symbol plates in accordance with DIN or in different colours upon customer request
- Lighting through bulb or LED (must be ordered separately)

Configuration of the part numbers following consultation with your sales partner.

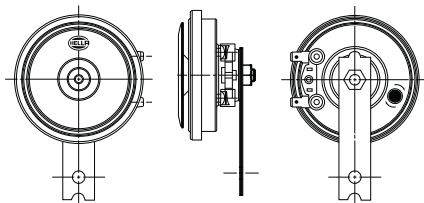


LED flasher unit 4DN

Universal connection of LED direction indicators for 12 V applications, with a maximum load-carrying capacity of 4 x 21 W, directional flashing or 8 x 21 W, warning flashing, failure monitor according to ISO 13207, black plastic housing with bracket and with blade terminals, mounting on 9-pin female connector housing 8JA 003 526-001 (not included in the scope of delivery).

12 V, 2+1+1x 21 W	4DN 008 768-161
Accessories, 9-pin female connector housing	8JA 003 526-001

Type approval: ECE ⁽²⁴⁾ 10R-041494

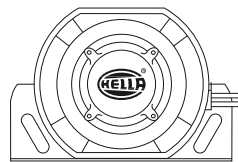


Strong tone horn set S90

90 mm diameter, 350 / 415 Hz, 113 dB (A) @ 2 m, fully shaped oscillator for optimal sound propagation, optimal ratio of size and power, slim matt-black design with a red diaphragm.

12 V	3AM 922 000-971
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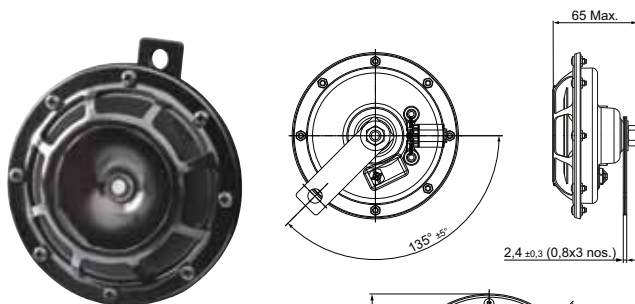
Type approval: ECE-R28



Reversing and warning alarm

Loud, far-reaching alarm tone, protection against reversed polarity voltage peaks, optionally with automatic adaptation to surroundings with changing sound levels.

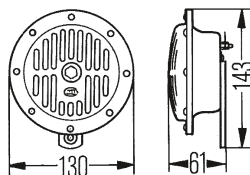
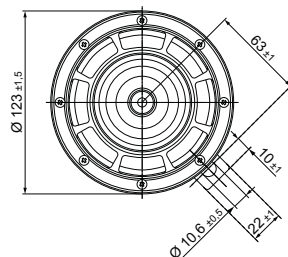
12 – 24 V, 1200 Hz, 87 – 112 dB (A) @ 1.2 m	3SL 996 139-001
12 – 36 V, 1300 Hz, 107 dB (A) @ 1.2 m	3SL 996 139-101
12 – 36 V, 1250 Hz, 112 dB (A) @ 1.2 m	3SL 996 139-111
12 – 24 V, 1200 Hz, 87 – 112 dB (A) @ 1.2 m	3SL 996 139-202
12 – 24 V, 1200 Hz, 90 dB (A) @ 1.2 m	3SL 009 148-001
12 – 24 V, 1200 Hz, 97 dB (A) @ 1.2 m	3SL 009 148-011
12 – 24 V, 1200 Hz, 107 dB (A) @ 1.2 m	3SL 009 148-021
12 – 48 V, 1200 Hz, 97 dB (A) @ 1.2 m	3SL 009 148-061
12 – 24 V, 1200 Hz, 102 dB (A) @ 1.2 m	3SL 009 148-071
12 – 24 V, 1200 Hz, 82 – 102 dB (A) @ 1.2 m	3SL 009 148-101

**Horn B133**

123 mm diameter, 105 – 118 dB (A) @ 2 m, generates a loud noise, robust housing with distinctive grill, high corrosion protection.

24 V, 300 ± 20 Hz	3AF 005 631-201
24 V, 450 ± 20 Hz	3AF 005 631-211

Type approval: ECE-R28 / ECE-R10

**Heavy tone horn DL50**

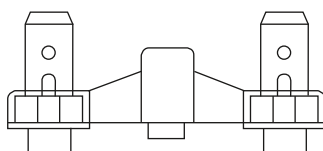
130 mm diameter, 114 dB (A) @ 2 m, deep and loud acoustic pattern, solid, black painted housing, robust protective grill, extremely durable.

12 V, 310 / 380 Hz SET	3CB 004 811-042
12 V, 310 Hz	3CA 004 811-001
12 V, 380 Hz	3CA 004 811-011
24 V, 310 Hz	3CA 004 811-021
24 V, 380 Hz	3CA 004 811-031

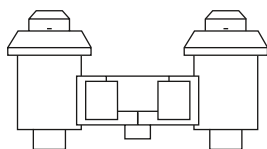
Type approval: ECE-R28 Ⓢ 01004, CCC



Drawing connection A



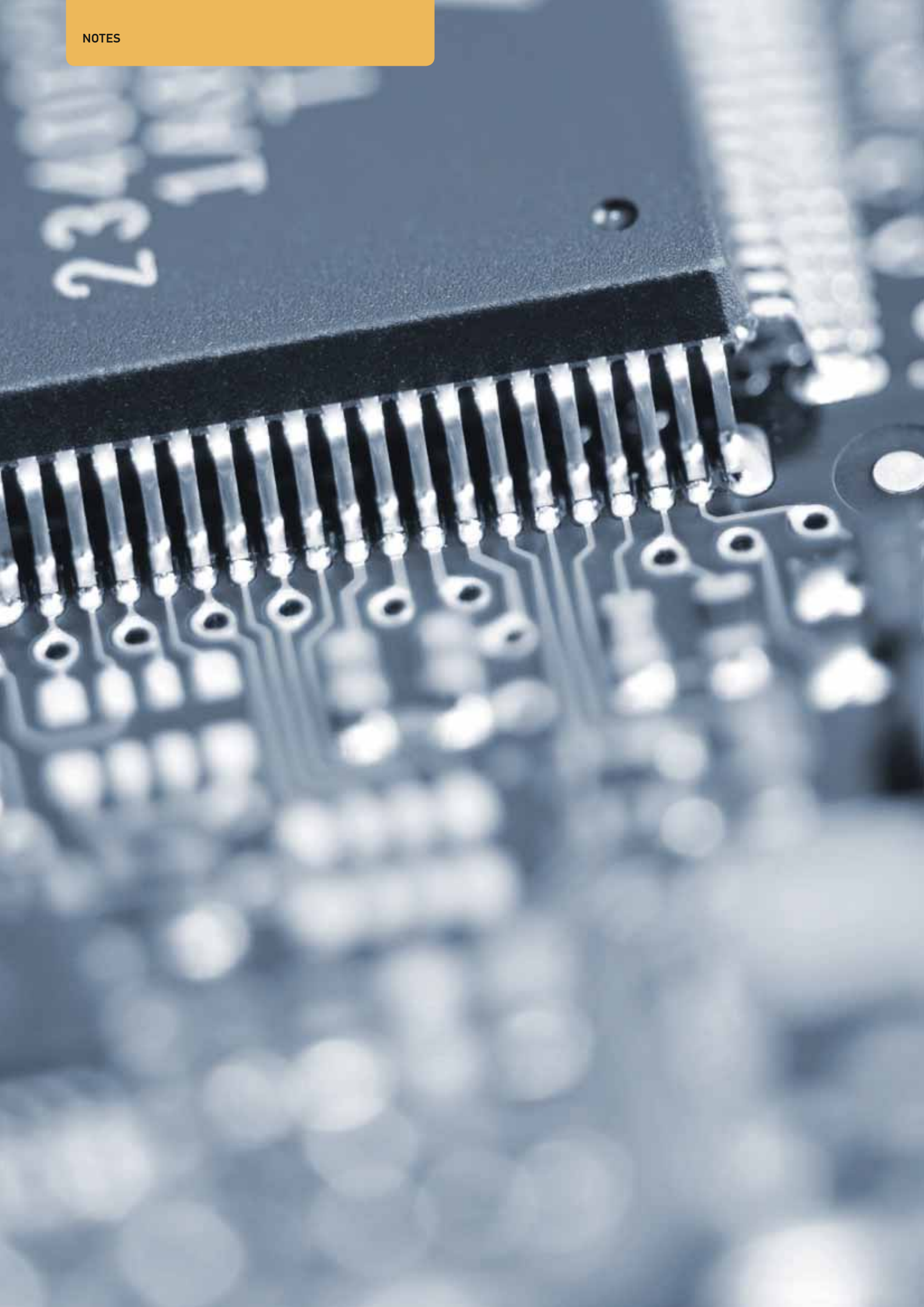
Drawing connection B

**Horn M26**

97 mm diameter, 15 dB (A) @ 2 m, long-life horn with full, high-quality acoustic pattern, zinc-coated housing, installation of a set comprising a high tone and deep tone achieves an optimal acoustic color.

12 V, 335 / 400 Hz, with PTFE pill, copper blade terminal (set), drawing connection A	3AM 002 952-891
12 V, 400 Hz, with PTFE pill, copper blade terminal, drawing connection A	3AL 002 952-811
12 V, 335 Hz, with PTFE pill, copper blade terminal, drawing connection A	3AL 002 952-861
24 V, 335 Hz, copper blade terminal, drawing connection A	3AL 002 952-871
12 V, 335 Hz, with PTFE pill, copper blade terminal, drawing connection B	3AL 002 952-841
12 V, 400 Hz, blade terminal, galvanically tin-plated, housing color black, drawing connection B	3AL 002 952-827
12 V, 400 Hz, with PTFE pill, copper blade terminal, front black, drawing connection A	3AL 002 952-857
12 V, 335 Hz, copper blade terminal, drawing connection B	3AL 002 952-917
12 V, 400 Hz, with PTFE pill, copper blade terminal, diode, drawing connection A	3AL 002 952-907
24 V, 400 Hz, with PTFE pill, copper blade terminal, drawing connection A	3AL 006 958-821
12 V, 400 Hz, blade terminal, galvanically tin-plated, drawing connection A	3AL 908 571-021
12 V, 335 Hz, blade terminal, galvanically tin-plated, negative connection via housing, drawing connection A	3AL 908 571-031
24 V, 335 Hz, copper blade terminal, diode, drawing connection A	3AL 002 952-927

Type approval: ECE-R28 Ⓢ 0020011



HAZARDOUS GOODS ORDINANCE

GGVSEB (previously GGVS) refers to the hazardous goods ordinance for roads, railways, and inland waterways. This ordinance implements the European Parliament and Council Directive 2008 / 68 / EC of September 24, 2008 on the inland transport of hazardous goods. Work lights with this mark are approved for mounting on conveyances that must comply with the provisions of GGVSEB / ADR.

IP PROTECTION CLASSES - BUY WITH CONFIDENCE

How well is a product protected from environmental influences? Worklights are exposed to things such as dust and water. The IP protection class states how resilient the product is. The classes are determined by DIN 40 050 Part 9. HELLA worklights are designed for various protection classes:

Protection class IP 5K4K

Dust may only penetrate to such an extent that function and safety are not impaired. Water that is sprayed from every direction at increased pressure against the housing must not have any damaging effect: water pressure approx. 4 bar.

Protection class IP 5K9K

Dust may only penetrate to such an extent that function and safety are not impaired. Water that is directed against the housing during high-pressure/steam-jet cleaning must not have any damaging effect; water pressure approx. 100 bar.

Protection class IP 6K4K

Dust must not penetrate. Water that is sprayed from every direction at increased pressure against the housing must not have any damaging effect: water pressure approx. 4 bar.

Protection class IP 67 / IP 6K7

Dust must not penetrate. No water may penetrate, even if the device is submersed for some time.

Protection class IP 6K8

Dust must not penetrate. Protection against continuous immersion.

Protection class IP 6K9K

Dust must not penetrate. Water that is directed against the housing during high-pressure/steam-jet cleaning must not have any damaging effect: water pressure approx. 100 bar.



You can find further information about the HELLA quality criteria at: www.hella.com/quality

OVERVIEW OF ICONS

CHARACTERISTICS

DESCRIPTION

COMMENTS

Power consumption of LED lights

Advantages of the LED:

Generally, LED lights need less power than bulb lighting. Savings of up to 90% are possible, which also helps to reduce CO₂.

Vehicle electrical system voltage



Defines the power supply for the lamp. This can be 12 V, 24 V or a flexible voltage range for multivolt (8 – 33 V).

Multivolt is the most flexible: Requires fewer versions, but has more electronic circuit components and is therefore more expensive.

Dust and water protection IP



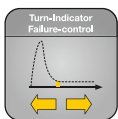
International Protection (IP) as per DIN 40050, Part 9. Specific definition for road vehicles.

The higher the protection class, the better the protection against penetrating media. IP 67 maximum value
→ Completely sealed against dust and water.



Resistant to high-pressure jet cleaners

Indicator failure check according to ECE-R48



Regulation according to ECE-R48:

The driver must be informed if the indicator function fails. To remain legally compliant, this requirement must also be fulfilled for LED lights. This requirement is fulfilled by means of an integrated self-diagnostic unit on the PCB of the LED and an electrical pulse. Since the end of 2011, this HELLA failure monitor with a pulse has been ISO Standard: ISO 13207.

If the indicator failure check is not ensured, the general vehicle type approval becomes void. This means it is illegal to operate vehicles without indicator failure check in countries affiliated to ECE-R48.

The indicator failure check is ensured in combination with ballasts HELLA part no. 5DS 009 552.

Electronic circuit

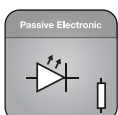


Active

Basically, two different circuits are possible for LED lamps:

Active:
LED current regulation through active electronics






Active:
Higher expenditure during development because of complex circuit and necessary EMC approval. Higher price because of electronic components, but optimal current regulation allows maximum LED design life.



Passive

Passive:
A specific voltage range is preset for the LEDs through a series resistor.

Passive:
Cost-effective solution without complex protection measures.

CHARACTERISTICS	DESCRIPTION	COMMENTS
<p>Thermal management</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Active</p> </div> </div> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Passive</p> </div> </div> </div>	<p>Active: Electronic power control of LEDs in the event of impermissibly high ambient temperatures. This ensures the LEDs are protected against destruction caused by overheating.</p> <p>Passive: Optimum layout of the components for even temperature distribution and temperature spreading.</p>	<p>Active: More development overhead with active thermal management and higher parts prices ensure optimal conditions for maximum design life.</p> <p>Passive: The warmer the LED gets through exterior factors or heat generated by its own operation, the shorter the service life.</p>
<p>Operating temperature</p> 	<p>Whether in cold or warm temperatures, our products must always be operational. Thermal management and an optimized housing design guarantee full functionality for all operating temperatures through product tests from -40°C to 100°C.</p>	
<p>Overvoltage protection</p> 	<p>Supplement to the electronics for protecting the LED against high voltage / current in the vehicle network as per ISO 7637-2.</p>	<p>Overloading of the LEDs can be caused by voltage peaks in the vehicle because of:</p> <ul style="list-style-type: none"> → Jump-starting → Faulty control units → Load-Dump Impulse (incorrect battery contact)
<p>Beacon failure check (DIN 14630 – Blue)</p> 	<p>Beacons for preferential road use.</p>	<p>A function monitoring system must be provided.</p>

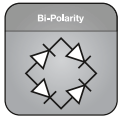
OVERVIEW OF ICONS

CHARACTERISTICS

DESCRIPTION

COMMENTS

Bi-polarity of the light



Even if the connecting cable is attached with reverse polarity, the LED functions fully.

The semiconductor in an LED must always be operated with the correct polarity. Inverse polarity damages the LED, so that LED lights are generally equipped with reverse polarity protection (diode). This function only works when "+" and "-" are correctly connected, though. If a lamp has a bi-polar circuit, the functioning is independent of the contact connections. This ensures poka-yoke (avoiding faulty assembly) in connection with indentation clamping technology, for example. However, the additional components on the PCB also increase the costs.

Polarity reversal protection



Even if the connecting cable is connected the wrong way round, there is still no danger for the electronics.

The semiconductor in an LED must always be operated with the correct polarity. Inverse polarity damages the LED, so that LED lights are generally equipped with reverse polarity protection (diode). This function only works when "+" and "-" are correctly connected, though. If a lamp has a bi-polar circuit, the functioning is independent of the contact connections. This ensures poka-yoke (avoiding faulty assembly) in connection with indentation clamping technology, for example. However, the additional components on the PCB also increase the costs.

SAE



Product has SAE type approval.

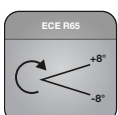
More information is provided next to the relevant products in the footer.

ECE




Product is licensed according to ECE guidelines.

ECE-R65



Defines the light values, light distribution, and colour location of beacons that are to be achieved.

Only beacons that fulfil ECE-R65 can be used on public roads.

CHARACTERISTICS	DESCRIPTION	COMMENTS
<p>Approval for transport of dangerous goods</p> 	<p>Lamp approved for transport of dangerous goods according to the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR; in German, GGVS).</p>	<p>Generally required for truck and trailer lighting. Prerequisite for receiving approval: Damage to the light source must not cause explosive media to ignite.</p>
<p>Electromagnetic compatibility</p> 	<p>Electromagnetic compatibility (EMC) tested and EU type approval issued.</p>	<p>If the light is not constructed according to EMC specifications, and thus is not certified, then interaction between it and other safety-relevant electronic systems may occur.</p> <p>Examples: Interference in the radio loudspeaker, impairment of ABS electronics, or failure of the lamp due to sensitivity to interference.</p>
<p>Automotive Electronic Council</p> 	<p>Components qualified according to automotive standard.</p>	<p>Electronic components (LEDs, diodes, ...) are more robust and safer than electronic components for industry thanks to automotive specifications.</p> <p>By using certified suppliers, a more robust design of the circuit is possible - even for longer periods of time with consistent quality. Thus slight additional costs for the components improve the service life of LED lighting functions.</p>
<p>Automotive Safety Integrity Level</p> 	<p>Product electronics are developed using the latest methods and according to the ISO 26262 safety guidelines.</p>	<p>This applies from July 2011 as "standard technology" are taken into account during development.</p>
<p>Corrosion proof Housing</p> 	<p>Product is protected against corrosion.</p>	<p>Additional layers of surface coating on the work lights greatly improve their durability. The housing is therefore ideally protected and also well-suited to application areas with a high risk of corrosion.</p>

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ELIVER – the light comparison tool

This online tool allows you to compare many HELLA work lights and beacons on the basis of their illumination in a realistic environment.

 www.hella.com/eliver



Work light configuration tool

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www.hella.com/worklight-configurator





Shapeline configuration tool

The HELLA Shapeline online configuration tool turns you into a lighting designer: With a few clicks, make your own vehicle light design for the front, sides, and rear end – and see the result directly after, as applied convincingly to a car outline

www.hella.com/shapeline



Electronics tool

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www.hella.com/upc





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